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Canadian Intellectual Property Office

CA 3177121 C 2023/10/10

(11)(21) 3 177 121

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) **Date de dépôt PCT/PCT Filing Date:** 2021/02/03
(87) **Date publication PCT/PCT Publication Date:** 2021/08/12
(45) **Date de délivrance/Issue Date:** 2023/10/10
(85) **Entrée phase nationale/National Entry:** 2022/08/02
(86) **N° demande PCT/PCT Application No.:** IB 2021/050881
(87) **N° publication PCT/PCT Publication No.:** 2021/156770
(30) **Priorité/Priority:** 2020/02/03 (US62/970,012)

(51) **Cl.Int./Int.Cl.** ***A47J 39/00*** (2006.01),
E05B 65/02 (2006.01), ***G06Q 50/12*** (2012.01),
G07C 9/00 (2020.01), ***G07F 17/40*** (2006.01)

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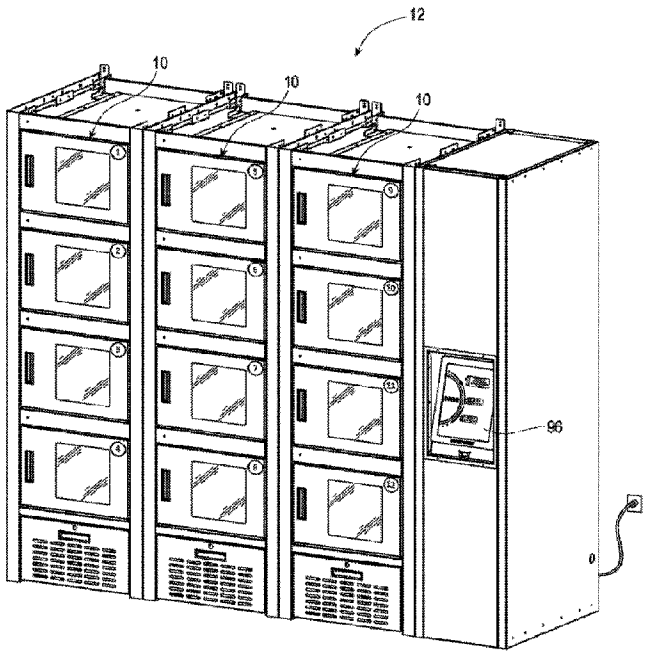
(54) **Titre : ASSEMBLAGE D'ARMOIRE A MANGER LIBRE-SERVICE**
(54) **Title: SELF-SERVE FOOD LOCKER ASSEMBLY**



(57) **Abrégé/Abstract:**
The present disclosure provides a self-serve food locker assembly that includes at least one integrated human-machine interface screen coupled to the digital processor via the network interface, at least one sensor configured to monitor an interior space of each food locker, and an external integrated heating assembly and a refrigeration assembly. The at least one digital human-machine interface screen displays that food has been placed into the locker when the at least one sensor detects that takeout food is placed into the food locker, that food has been removed from the food locker when the at least one sensor detects that takeout food is removed from the food locker, and indicates when a predetermined wait time for removing food elapses for a loaded food locker.

ABSTRACT

The present disclosure provides a self-serve food locker assembly that includes at least one integrated human-machine interface screen coupled to the digital processor via the network interface, at least one sensor configured to monitor an interior space of each food locker, and an external integrated heating assembly and a refrigeration assembly. The at least one digital human-machine interface screen displays that food has been placed into the locker when the at least one sensor detects that takeout food is placed into the food locker, that food has been removed from the food locker when the at least one sensor detects that takeout food is removed from the food locker, and indicates when a predetermined wait time for removing food elapses for a loaded food locker.

Date reçue/Date received 2023-03-24

SELF-SERVE FOOD LOCKER ASSEMBLY

BACKGROUND

0001 The present disclosure relates to self-serve food locker assemblies, systems, and methods. More particularly, this disclosure includes automated self-serve food locker assemblies, systems, and methods providing touchless operation of pass-through food lockers.

0002 As consumers demand more diverse food options without sacrificing quality and convenience, restaurants and fast-casual brands are seeking innovative ways to provide a unique and positive customer experience. Many brands emphasize speed and ease of ordering by offering to-go menus and the ability to order food online. When managed effectively, this minimizes the wait time for customers while providing the restaurant with an additional revenue stream. However, unique challenges are presented when attempting to create a seamless takeout ordering experience.

0003 A typical restaurant relies on the availability of staff members for handling customer to go orders. In a busy restaurant setting, this can be a stressful and time-consuming ordeal for both the customer and the restaurant. Mix-ups and unnecessarily long wait times are not uncommon. Human labor is one of the highest operational costs for restaurants; however, people are becoming unnecessary, and even detrimental in many scenarios, such as handling of take-out orders.

0004 Another challenge associated restaurants face in providing takeout is combating heat gain or loss in the food while awaiting pickup. Takeout orders are often placed in paper or plastic bags, which do little to prevent heat gain or loss during storage. Receiving food too hot or cold often frustrates consumers can damage a restaurant's reputation. In addition, perishable foods cause safety concerns when mishandled. The USDA recommends that once food is cooked, it should be stored at 140 degrees Fahrenheit (60 degrees Celsius) or above, and cold foods should be stored at 40 degrees Fahrenheit (4.44 degrees Celsius) or below until consumed. For takeout foods, it is recommended that perishable foods should not be kept between 40 degrees Fahrenheit (4.44 degrees Celsius) and 140 degrees Fahrenheit (60 degrees Celsius) for over two hours.

0005 The Covid-19 pandemic heightened the need for takeout food delivery improvements within new health safety protocols. Minimizing human touching of prepared

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takeout food containers and delivery compartments is a demonstrable factor in limiting global bacteriological and viral contaminations.

0006 There is a need for food locker assemblies, systems, and methods that provide: 1) automated control of food locker access for loading and unloading the locker; 2) touchless pass-through food compartments for active food modular locker arrays between a kitchen environment and a public space; 3) ultra-violet sterilizing lights in germ food lockers; 4) separate hot – cold lockers with integrated timed heating/cooling temperature control; 5) food compartment doors with integrated human machine interface (HMI) control screens; and 6) linear drive hardware on touchless food compartment motorized doors.

SUMMARY

0007 The disclosure details a unique steel cabinetry series that leverages today's technology to eliminate the common challenges involved in takeout ordering. The to go ONDO™ Self-serve Food Locker assembly, system, and method with hot and cold food storage capability provides a convenient automated self-service ordering platform for a virtually enhanced dining experience. Not only does the system benefit consumers by allowing them to skip the lines and retrieve their orders directly, but it also reduces the restaurant's operational costs by eliminating the need for additional staff. Through automating the ordering process and eliminating unnecessary staff intervention, restaurants can reduce congestion in waiting areas as multiple customers are served simultaneously. The customer will experience streamlined service with assurance they are receiving their food at a safe temperature and from a bacteria and virus free storage environment.

0008 The principal components of the ONDO™ Self-serve Food Locker assembly, system, and method are food locker doors with an integrated Human User Machine Interface, (HMI) or User Interface (UI), which serve as a customer interface. The doors are housed in cabinetry and provide pass-through access using automated flip-up food locker doors or conventional opening food locker doors for easy order retrieval. Integrated heating and/or refrigeration system control food locker internal temperature for preserving the customer's order. The ONDO™ Self-serve Food Locker assembly, system, and method provide a "modular," energy efficient insulated system utilizing parallel stacking of self-contained towers for expansion as befits venue or facility space availability.

0009 Once the customer places an order via smartphone or through a touch-screen kiosk in the restaurant, they will be prompted for payment, which can be done at the kiosk or via smartphone for mobile orders. Once payment is received, the prepared food is placed in an

ONDO™ food locker and the kiosk or mobile application notifies the customer that their order is ready for pickup. The notification indicates the food locker number where the order is placed and a reminder it must be picked up within a predetermined time frame. The customer has this window of time to retrieve their food from the food locker before the food is removed and discarded by restaurant staff. The food locker's HMI/UI screen displays the locker number, the customer's first name or other customer provided data for easy identification. In addition, the countdown from the predetermined pickup time window is displayed. Once the customer finds the correct locker, he or she is prompted to press an on-screen button for input of a PIN number or a bar code or quick response (QR) code to open the food locker. This customer input prompts the automated food locker doors to open, allowing food retrieval. An integrated occupancy sensor will sense when the food has been collected and will automatically close the door.

0010 The ONDO™ Self-serve Food Locker assembly, system, and method also incorporate monitor screens for both the food service attendant(s) and kitchen staff. This capability provides monitoring each order's queue and status.

BRIEF DESCRIPTION OF THE DRAWINGS

0011 Various embodiments are depicted in the drawings for illustrative purposes and should in no way be interpreted as limiting the embodiments. In addition, various features of different disclosed embodiments can be combined to form additional embodiments, which are part of this disclosure.

0012 FIG. 1 is a top right front perspective view of a modular 3 x 4 array for an embodiment of the ONDO™ Self-serve Food Locker assembly.

0013 FIG. 2 is a representative human machine interface interactive screen for an embodiment of the ONDO™ Self-serve Food Locker assembly.

0014 FIG. 3A is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 2 x 3 array of 12-inch by 16-inch (30.48 cm by 40.64 cm) modular food lockers in a 48-inch (1219.2 mm) bay.

0015 FIG. 3B is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 2 x 4 array of 12-inch by 12-inch (30.48 cm by 30.48 cm) modular food lockers in a 48-inch (1219.2 mm) bay.

0016 FIG. 3C is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 2 x 5 array of 8-inch by 12-inch (20.32 cm by 30.48 cm) modular food lockers in a 48-inch (1219.2 mm) bay.

0017 FIG. 3D is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 3 x 5 array of 8-inch by 8-inch (20.32 cm by 20.32 cm) modular food lockers in a 48-inch (1219.2 mm) bay.

0018 FIG. 4A is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 2 x 3 of 12-inch by 16-inch (30.48 cm by 40.64 cm) modular food lockers in a 60-inch (1524 mm) bay.

0019 FIG. 4B is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 3 x 4 array of 12-inch by 12-inch (30.48 cm by 30.48 cm) modular food lockers in a 60-inch (1524 mm) bay.

0020 FIG. 4C is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 3 x 5 array of 8-inch by 12-inch (20.32 cm by 30.48 cm) modular food lockers in a 60-inch (1524 mm) bay.

0021 FIG. 4D is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 4 x 5 array of 8-inch by 8-inch (20.32 cm by 20.32 cm) modular food lockers in a 60-inch (1524 mm) bay.

0022 FIG. 5A is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 3 x 3 array of 12-inch by 16-inch (30.48 cm by 40.64 cm) modular food lockers in a 78-inch (1981.2 mm) bay.

0023 FIG. 5B is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 4 x 4 array of 12-inch by 12-inch (30.48 cm by 30.48 cm) modular food lockers in a 78-inch (1981.2 mm) bay.

0024 FIG. 5C is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 4 x 5 array of 8-inch by 12-inch (20.32 cm by 30.48 cm) modular food lockers in a 78-inch (1981.2 mm) bay.

0025 FIG. 5D is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 6 x 5 array of 8-inch by 8-inch (20.32 cm by 20.32 cm) modular food lockers in a 78-inch (1981.2 mm) bay.

0026 FIG. 6A is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 4 x 3 array of 12-inch by 16-inch (30.48 cm by 40.64 cm) modular food lockers in a 96-inch (2438.4 mm) bay.

0027 FIG. 6B is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 5 x 4 array of 12-inch by 12-inch (30.48 cm by 30.48 cm) modular food lockers in a 96-inch (2438.4 mm) bay.

0028 FIG. 6C is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 5 x 5 array of 8-inch by 12-inch (20.32 cm by 30.48 cm) modular food lockers array in a 96-inch (2438.4 mm) bay.

0029 FIG. 6D is a front elevational view of an embodiment of an ONDO™ Self-serve Food Locker assembly for a 7 x 5 array of 8-inch by 8-inch (20.32 cm by 20.32 cm) modular food lockers in a 96-inch (2438.4 mm) bay.

0030 FIG. 7 is a representative electrical system schematic 200 for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0031 FIG. 8 is a representative system schematic 300 for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0032 FIG. 9 is a continuation of the representative system schematic for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method of FIG. 8.

0033 FIG. 10 is a continuation of the representative system schematic for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method of FIG. 8

0034 FIG. 11A is a representative human machine interface screen for runner input to the system for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0035 FIG 12 is a continuation of the representative system schematic for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method of FIG. 8.

0036 FIG. 13 is a representative human machine interface screen shot of food locker status for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0037 FIG. 14 is a representative method schematic 500 for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0038 FIG. 15 is a continuation of the representative method schematic for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method of FIG. 14

0039 FIG. 16A is a front left top perspective view of an automatic pass-through modular food locker 10 assembly for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0040 FIG. 16B is a front right bottom perspective view of the automatic pass-through modular food locker 10 of FIG. 16A.

0041 FIG. 17A is a rear left top perspective view of the automatic pass-through modular food locker 10 assembly of FIG. 16A.

0042 FIG. 17B is a rear right bottom perspective view of the automatic pass-through modular food locker 10 of FIG. 16A.

0043 FIG. 18 is a front right top perspective view of a power drawer for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0044 FIG. 19A is front right top perspective view of a technology tower station for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0045 FIG. 19B is front right top perspective view of a technology remote mounted station for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0046 FIG. 20 is front right top perspective view of a self-contained tower with a 1 x 4 array of stackable, modular automatic pass-through food lockers for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method.

0047 FIG. 21 is rear left top perspective view of the self-contained tower with a 1 x 4 array of stackable, modular automatic pass-through food lockers of FIG. 20.

0048 FIG. 22A is a front elevational view of the is front right top perspective view of the self-contained tower with a 1 x 4 array of stackable, modular automatic pass-through food lockers of FIG. 20.

0049 FIG. 22B is a right-side elevational view of the self-contained tower with a 1 x 4 array of stackable, modular automatic pass-through food lockers of FIG. 20.

0050 FIG. 23 is a cross-sectional sectional view of FIG. FIG. 22A taken at "23 – 23."

0051 FIG. 24 is an exploded view of self-contained tower with a 1 x 4 array of stackable, modular automatic pass-through food lockers of FIG. 20.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

0052 Embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method are disclosed in FIGS. 1 – 24.

0053 FIG. 1 depicts a representative 3 x 4 array of modular automatic pass-through self-serve food lockers 12 for an embodiment of the ONDO™ Self-serve Food Locker assembly, system, and method. The main cabinet houses twelve individual modular automatic pass-through self-serve food lockers 10 with internal dimensions of 12" x 12" x 19" (30.48 cm x 30.48 cm x 48.26 cm). Each food locker 10 is configured for hot or cold food item storage. Multiple modular arrays 12, size permutations, and combinations of the disclosed food lockers 10 for variants are in depicted in FIGS. 3A – 6D. Food service staff can toggle between heating and refrigeration according to the food being prepared. Each individual food locker can be configured for heating or cooling with the flip of a switch.

Customer and administrative access to the food locker ordering, retrieval and other delivery for some variants is managed through an integral or remote touch screen 96, FIGS. 1, 2, 19A and 19B. Operational control of the food locker, including the temperature is managed through key board and touch screen input, FIGS. 11A, 11B, and 13, to a digital processor, a memory module coupled to the digital processor, a network interface comprising wireless connectivity and coupled to the digital processor, and software, via a web portal, mobile applications, or on-site digital control station FIGS. 7 – 15, 19A and 19B. Through this combined technology, a variety of functions can be implemented to manage the food lockers 318, FIG. 8, including temperature control, such as automatic temperature conversions based on time of day, via temperature readings from embedded probes (if the temperature reaches a rating out of the threshold, the compressor or heating pad will automatically energize to bring that temperature back to the desired rating), or via a queuing system (an algorithm that dynamically assesses the state of all lockers and orders to automatically convert temperatures in real time, as needed). The system for embodiments of the ONDO™ Self-serve Food Locker recognizes orders and assess locker availability based on temperatures and the required temperature for an order, 318, FIG. 8. If there are no available lockers for the needed temperature, the system automatically converts a vacant locker to the desired temperature while the kitchen is preparing the meal, 316, FIG. 8,

0054 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide electrical connectivity as depicted generally in the representative electrical schematic diagram 200, FIG. 7. 12VDC power supplies 202 and 204 provide electrical power to the microprocessor 206, user interface touch screen 296, bar code or quick response code scanner(s) 298, and locker control circuity 208 for the solenoid lock, linear actuator, LED lighting, evaporative plate, and service resource module(s) of the food locker 210.

0055 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method of the layout can apply to individual food lockers, modular arrays of food lockers, or the entire modular array wall of food lockers, FIGS. 3A – 6D. For example, if a wall has 3 columns of 4 boxes, the system operator can set columns 1 and 2 to hot, and column 3 to cold (cluster method); likewise, the system operator could set the first 2 boxes in column 1 to hot, the bottom 2 boxes in column 1 to cold, and the remaining 2 columns to ambient (combination of individual and cluster). This locker management 318 can be set up in the system for any combination or number of modular arrays of food lockers, FIG. 8.

0056 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide multiple-size, dual-zone food lockers where two lockers are set adjacent with an insulated divider separating them. These dual-zone lockers share one forward and one rear door which would unlock for placement/retrieval in/from both lockers. This gives system operators the option to offer multiple meals for one order. For example, if a soda and hamburger were ordered, one locker would be set to hot and the other to cold; if after that, someone orders four hamburgers, the system operator could set both lockers to hot, to place two hamburgers in one locker and two hamburgers in the other. This flexibility for various orders with multiple foods selected highlights the novel utility of the ONDO™ Self-serve Food Locker assembly, system, and method. This utility offers the flexibility to accommodate for additional space during peak periods. Both dual-zone lockers need not be filled. If the single-zone lockers are all occupied, and the system operator needs to place an additional order, they can simply use the dual-zone locker for a single item.

0057 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide lockers constructed of a food grade stainless-steel cabinet frame cored with flame retardant material. The locker interior is lined with 2400-degree Fahrenheit heat retardant thermal insulation. A thermal break 66 is installed at each door opening to limit condensation, FIGS 16A – 17B. Mounted on the cabinet of lockers are doors comprised of dual paned insulated glass fixed within a composite frame that houses a human machine interface with LCD screen to serve as a customer interface. The locker doors are tempered insulated glass with UV blocking film 70 fixed within a composite frame for users to see the food, and internal LED lighting. These locker doors can also be solid, matching the finish of the unit. The front and rear locker doors are mounted to the cabinet via a linear drive, allowing the doors to automatically open and close when prompted. Some embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide traditional spring-loaded swing doors without screens are also illustrated as part of the design as a feature set. Some embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide manual rear doors mounted to the rear of the locker for loading prepared orders awaiting customer pickup, FIGS. 20 – 24. Food grade stainless steel left and right-side panels, 122 and 120 respectively, and base 124 house variants of modular food locker configurations, FIG. 24.

0058 Embodiments of the ONDO™ Self-serve Food Locker assembly provide a safety light curtain sensor transmitter 40 and a safety light curtain sensor receiver 42 on opposite

sides of an automatic touchless user access door providing dual panel insulated glass with UV blocking film 70 and access to a food grade stainless steel food locker cavity 72, FIGS. 16A – 17B. The automatic touchless user access door is attached to and driven by a motorized linear actuator 48 affixed to a food locker external surface by an adjustable field serviceable linear actuator mounting assembly 58 and a linear actuator tension/compression assembly 56 with an electro-mechanical solenoid lock 50. The motorized linear actuator electronic control, driver, food compartment lighting, food compartment UV lighting, and access door safety interlock are all controlled by a front flag food locker chamber control module 44.

0059 The food locker access door status is visibly displayed by an access door opening indicator lamp/LED 52. An automatic or manual (not depicted) food locker kitchen access door is controlled by RFID sensor or fingerprint sensor 62, FIGS. 16A – 17B. An ultra-high-molecular-weight (UHMW) high-heat polyethylene thermal break 66 frames the access food locker door contact with the opening to the food locker cavity.

0060 The kitchen access door driver, food compartment lighting, food compartment UV lighting, and access door safety interlock are controlled by a rear flag food locker chamber control module 46 and an electro-mechanical solenoid lock 50. A santoprene, dart-style high temperature polyvinyl chloride gasket 64 insulates the customer access door and kitchen access door to the food locker cavity. Heating the food locker cavity is achieved by a silicone rubber mat heating element with a heat diffuser/conductive aluminum plate 54.

0061 Cooling the serf-serve food locker cavity is achieved by a refrigerant line feed 76 from a food locker module centric compressor 108, a capillary tube refrigerant return line 78 to the compressor 108, and a coolant control solenoid valve 74, FIGS. 16A – 17B, 23. The food locker cavity is insulated by 2 inches thickness of closed-cell polyiso-foam with embossed aluminum faces 68 enclosed between inner and outer food locker cavity shells 68. An external food locker top surface provides a wiring access point 60 for food locker cavity internal lighting. A main power source drawer 90, FIG. 18, with a Programable Logic Controller (PLC) supplies signal distribution for customer door access and power distribution for alternating current, direct current and emergency battery power for the system. The power source drawer 90 also has provisions for an on/off circuit breaker with an integrated power switch 92 and a switch position for chamber emergency access 94. Technology stations provide convenient housing for the User Interface Touch Screen PC. One version consists of a food grade stainless steel or powder coated finish 100 towers

102, FIG. 19A that can be attached to self-contained stackable food locker columns with independently controlled pass-through food lockers and mechanical/electrical access doors with integrated handles and security lock, i.e., FIGS 1, 20 – 24. The second version of technology stations is a housing that can be hung or attached to a column or wall with a food grade stainless steel or powder coated finish 100, FIG. 19B. A typical food locker column consists of a locker as described in FIGS. 20 – 24 providing temperature-controlled food locker chambers, FIGS 16A – 17B, the main AC power source w/PLC interface and DC power drawer 110, the pressure controlled compressed gas refrigeration system 108, all contained within the tower. FIGS. 3A – 6D, and 20 – 24 demonstrate several of the modular configurations for the embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method components disclosed and described in FIGS. 16A – 19.

0062 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide lockers in a variety of configurations to suit a wide range of food and beverage items.

0063 Dry food lockers are provided for foods picked up within a brief period of time according to all food safety standards. This unit will incorporate a simple shelf base for storing food. Hot food lockers are provided for cooked foods served hot. The hot configuration includes an induction warmer within the food locker interior.

0064 Cold food lockers are provided for preserving drinks, frozen foods, salads, or other foods served cold. The cold food locker configuration includes an evaporative plate that lines the food locker interior.

0065 Hot and Cold Combination food lockers provide an interior partitioned into two sections. One section provides the silicone mat heater, and the other provides an evaporative plate lining for storing both hot and cold foods at the appropriate temperature. Hot and cold lockers are electronically controlled via digital control mechanisms and sensors. Individual lockers can be connected to heating or cooling via a time delay relay activated switch at the rear of the unit. Lockers storing hot food include a silicone rubber mat (SRM) heater 54, FIG. 16A, with adjustable heat settings for keeping food at an optimal temperature while awaiting pickup. The warmer also includes built-in safety features such as over-heat protection to mitigate burn and fire risks.

Glass Door with Integrated HMI LCD Screen

0066 Food locker access doors are constructed of a glass panel mechanically fastened to a composite frame. Each food locker includes an integrated human machine interface (HMI)

panel mounted to the door frame behind the glass. The HMI is programmed so graphics and textual information, such as food locker number and the first name and last initial of the customer are displayed on the screen. The HMI is linked to the kiosk within the restaurant, which is a platform for ordering and processing payments. The food ordering and payment program enables the customer to open the food locker door by pressing an on-screen door open button when prompted. After the food is removed, an integrated occupancy sensor signals the automated doors to close after a predetermined time.

Automated Flip-up Doors

0067 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide an automated system activating linear drive hardware, which allows the food locker doors to automatically open when prompted by the customer. The automatic food locker doors allow for a streamlined and elegant, handle-less cabinet design. The sleek design simplifies cleaning while giving an aesthetically pleasing appearance. With this system, the food locker door silently glides up and out of the customer's way, which provides touchless, and unobstructed access to the particular modular food locker housed in the cabinet.

0068 Automatic food locker door mounting hardware is mechanically fastened to the composite frame and the lift mechanisms are fastened on either side of the food locker's interior cavity FIGS. 16A – 17B. Once the door mounting hardware is mounted to both the food locker door frame and the food locker interior, the food locker door is easily removed and swapped if needed without tools.

0069 The linear drive hardware 48, 50, 56, and 58 to activate the automatic food locker doors are powered via a 12V power supply mounted in a field serviceable drawer in the bottom of the cabinet and external to each individual modular food locker in the array of food lockers in the cabinet, FIGS. 16A – 18. The linear drive hardware connects a push button switch, so that the customer can close the food locker door with the push of an on-screen button. The food locker door can also be programmed via the HMI to close automatically after a predetermined time. The linear drive hardware 48, 50, 56, and 58 also establish a wired connection to a push button battery backup switch allowing the vendor to open the food locker should a power failure occur.

Integrated Refrigeration and Heating Systems

0070 Hot and cold food lockers are electronically controlled via digital control mechanisms and sensors. Individual food lockers can be connected to heating or cooling via

a time delay relay activated switch at the rear of the unit. Food lockers storing hot food contain a 110V silicone mat heater 54 with adjustable heat settings for keeping food at an optimal temperature while awaiting pickup FIGS. 16A – 17B. The warmer also includes built-in safety features such as over-heat protection to mitigate burn and fire risks.

0071 Variants include food lockers configurated for cold food and beverage items, refrigerated with an evaporative plate lining the internal food locker cabinet space. Using a plate type evaporator 80 allows for a compact, cleanable surface on the interior of the food locker. The evaporative plate 80 has an integrated supply and return for circulating refrigerant throughout its entire surface area. This supply and return will be piped to a compressor and evaporator, which can either be remote to the unit, or housed within the lower portion of the cabinet. The plate is a light weight, formable metal such as aluminum, formed to line the interior walls of the food locker.

0072 Hot and Cold food lockers are partitioned to integrate both the silicone mat heater 54 and the evaporative plate 80 for storing hot and cold food items, respectively.

System Technology Overview

0073 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide a digital processor, a memory module coupled to the digital processor and a network interface comprising wireless connectivity and coupled to the digital processor and this local microprocessor assembly, and whereby the system synchronizes with the cloud on a regular cadence. Once an order is delivered, the local microprocessor assembly and system sends the information to the cloud, and cloud system sends wireless 720 notification (email, SMS, etc.) to the customer's hand-held digital device 700, FIGS. 19A and 19B.

0074 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide a system using central controller to de-energize or energize specific magnetic locks based on food locker doors that need to be opened or closed. This central controller also handles any LED lighting associated with individual food lockers or food locker doors.

0075 Upon initial implementation of embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method, an administrator user profile is created. The administrator oversees internal system and operational management of the ONDO™ modular food locker wall installation. The administrator adds employee users named runners with limited privileges within the web portal control of the system, and limited

privileges in operating the physical ONDO™ modular food locker wall. For example, these runners unlock vacant lockers to load food. The administrator may grant runners access to unlock occupied food lockers to remove expired orders, clean the food locker internal cavity, assessing the state of the food locker doors, and similar food locker operational maintenance activities.

0076 Embodiments of the ONDO™ Self-serve Food Locker assembly, system, and method provide an abbreviated portal available for customers to set up their own profile. These customers will have more limited rights than runners. These customers store information such as their name, contact method, additional identification parameters, and a personal unlock code of their choice, which will be used for any order they place.

System and Method of Use

0077 A method using a non-transitory computer-readable medium comprising executable instructions that, when executed by a processing device, cause the processing device to perform these steps of providing food to a customer from a self-serve food locker for an embodiment of the ONDO™ Self-serve Food Locker assembly, and system, FIGS. 9, 14 and 15:

A. Setting up customer identification 358, 502;
B. Inputting customer identification 336, 342, 502;
C. Placing food order into the system 504;
D. Receiving food order requirements and setting kitchen requirements 506;
E. Providing system queuing analysis for the food order 508;
F. Adding the food order into the kitchen's queue 512 and setting order status to "In Progress" 514;
G. Notifying customer that the food order is received and in queue for delivery 516;
H. Preparing the food order 518;
I. Marking the food order complete 520 and generating metadata including required system temperature for the food order 522;
J. Generating and sending a self-serve food locker access code to the customer 524;
K. Scanning the self-serve access code on rear system display screen(s) 526;

L. Storing the code in the system including customer identification, assigned self-serve food locker, temperature reference, self-serve locker occupied status, and self-serve locker time stamp 528;

M. Providing rear portal access to the self-serve food locker for loading the customer order 528;

N. Comparing time/stamp to the current time 532 and if time/stamp has expired 534;

O. Receiving a customer scanned system food locker access code from a remote customer hand-held digital device 538;

P. Searching the system for the scanned code 540;

Q. Opening the designated self-serve food locker for customer to receive order 542;

R. Closing and locking the empty self-serve food locker 544;

S. Deactivating the customer's self-serve food locker access code and providing access to vendor to empty the self-serve food locker 536;

T. Erasing customer identification and accessing code from system 546;

U. Emptying the self-serve food locker 548; and

V. Setting the self-serve food locker system status to available and erasing the prior access code and customer identification erased 546.

0078 FIG. 15 is a flow diagram illustrating a method of runner use 500 for embodiments of an ONDO™ Self-serve Food Locker assembly, system, and method under the disclosure. This method 500 may be performed by processing logic that comprises hardware (e.g., circuitry, dedicated logic, programmable logic, microcode, etc.), software (e.g., instructions run on a processing device to perform hardware simulation), or a combination thereof, and provides the operational steps for the apparatus and system.

0079 The system generates a unique code associated to each customer's individual order. This code will be sent to the customer (via SMS, email, mobile app, etc.) upon completion of their order, FIGS. 8 – 13B. All the system access and control information are stored on the cloud database, and available to view on the ONDO™ web portal.

0080 A customer places order through any means (mobile app, 700, 702, FIGS. 19A and 19B, kiosk, FIG. 19B, at register, on website) 504, FIG. 14. Once the kitchen has prepared the order, the runner approaches the ONDO™ wall. In some capacity, the runner is identified by the system as a runner (specific user privileges). This can be through facial

recognition, employee badge, PIN code, etc. 552, FIG. 15. The runner profiles are created by the administrator or upon initial implementation to provide the appropriate users "runner" privileges. The system reads their code and cross-references with the database for identification of the user, along with information; specifically, their user privileges.

0081 The system indicates which locker(s) to load with food. This can be done through these ways: The runner scans a 2D or 3D barcode, and the system assigns a food locker based on availability, 316, FIG. 8. The runner manually indicates the temperature of each order through a user interface, FIGS. 11a, 11B, and 13, and the system assigns lockers based 316, FIG. 8, on availability and temperature of each locker. The temperature information is embedded in the 2D or 3D code, and the system reads that information to assign lockers based on temperature and availability.

0082 The runner logs into the system using a mobile digital device 700 (wirelessly connected 720), FIGS. 19A and 19B, or stationary (touchscreen) user interface, FIG. 11A, after which the system identifies the user as a "runner" and logs them in with special user privileges, FIGS. 10 and 15. The runner is shown the state of all food lockers (available, occupied, hot, cold, etc.) 376, 402. From that, the runner decides which food lockers to load 404. Those food lockers are recorded in the system 406 with the associated orders and are now deemed occupied. The runner manually indicates the temperature of each order, and the system assigns food lockers based on availability and temperature of each food locker. The runner types in a code corresponding to the order number, in which the order information is embedded. The system reads that information to assign lockers based on temperature and availability. The system automatically taps into the database to update that food locker's state.

0083 The food locker door is closed either automatically (after a set duration following food locker door unlock, through occupancy sensor which indicates food has been loaded and the runner's hand is not in the food locker any longer or through a combination of both) or manually.

0084 The local system synchronizes with the cloud portal and stores information upon completion of loading, FIG. 8. That information includes, but is not limited to, time/date, order number, food details (if applicable), and status of food locker.

0085 The cloud system sends a notification to the customer through one, or a variety, of: SMS text, Email, and/or mobile application.

0086 Included in the notification are: 2D/3D barcode, unlock PIN, assigned food locker(s)

number(s), ONDO™ modular food wall location (if the system is handling multiple locations), order information, a duration for pickup 410, 524.

0087 Optionally, the system can generate subsequent notifications serving as reminders to the customer to pick up their order, and the time remaining before the possibility of pick-up has expired. If the food is picked up before expiration 542, the locker is set to available and any customer access codes for that locker are erased, 546. If the time has expired before the food has been picked up 534, the kitchen is notified to empty the locker and any customer codes for that locker are deactivated 536.

0088 If the food is picked up before expiration, the customer arrives at the station and unlocks their assigned food locker(s) via the process selected by the customer namely, 2D/3D barcode, unlock PIN 538 or an unlock button on customer's mobile digital device 700.

0089 The system reads the unlock code and cross-references with the data stored on the system microprocessor(s) and cloud-based data storage 390, 542, 560 as part of a digital processor, a memory module coupled to the digital processor and a network interface comprising wireless connectivity and coupled to the digital processor. A query is run in the local database that searches for the unique unlock code. If the unlock code is not found in the database, the user is notified that their code was invalid. If it is found in the database, the associated food locker door is unlocked. The system pulls all information regarding that order (the immediately relevant piece of information being the door identification number) 540 and signals the central relay controller to de-energize the magnetic lock for that respective food locker door for a set duration to give the customer an opportunity to approach the door and open it. The customer then retrieves their food from the identified food locker 542.

0090 If the food is not picked up before expiration, the runner/administrator is notified of expired order(s) 536. The runner goes to the station and unlocks the food locker(s) with expired food in them and removes the food 548.

0091 The food locker lock will remain de-energized for a set period, 380, FIG. 10, . After that period of time, it will re-energize, then locking it. The unlock code remains active for a set duration after that, allowing the user to re-enter it if they missed the window of time the food locker door was unlocked.

0092 The food locker status is then updated in the local database as "vacant/available". Every time there is a state change in any food locker, such as this, the local microprocessor

controller synchronizes the food locker status change with the cloud e.g., FIG. 14, 532, 528, 546.

0093 The food locker door is closed either automatically (after a set duration following the initial unlock; or through occupancy sensors which indicate food has been loaded and the runner's hand is not in the food locker any longer; or through a combination of both), or manually. A timer can be set to trigger a notification to the administrator if the door is left open and automatically close the food locker door via linear drive. The relay board signals the specific linear driver to initiate door closing. A resistance sensor is implemented to deactivate door closing upon recognizing resistance to the door (example - If somebody's hand is still in the threshold) to prevent injury or malfunction. If this occurs, the system implements a secondary duration threshold where the food locker door is reopened for a set amount of time, and then it will attempt to close again. This can repeat a set number of times until a notification error message is sent to the administrator and the web portal. The administrator can deactivate that food locker for further use until reactivated. In a deactivation period, the food is considered unavailable for loading by the system so that no orders are routed to that locker. The deactivated food locker temperature control is turned off to avoid unnecessary power consumption. The administrator's food locker deactivation rights are discretionary.

0094 To manually close a food locker door, the administrator and runners are notified of the open food locker door so it can be manually closed. An LED light 52 will default to alarm status and blink to indicate the food locker door has been left open, FIGS. 16A – 17B. An error message on the digital control screen appears with the error message "Door 'NN' has been left open. Please close."

0095 The local system microprocessor controller synchronizes with the cloud portal and stores information upon completion of removal. That information includes, but is not limited to time/date, order number, food locker details (if applicable), and/or "food locker now available."

0096 In the descriptions above and in the claims, phrases such as "at least one of" or "one or more of" may occur followed by a conjunctive list of elements or features. The term "and/or" may also occur in a list of two or more elements or features. Unless otherwise implicitly or explicitly contradicted by the context in which it is used, such a phrase is intended to mean the listed elements or features individually, or the recited elements or features combined with the other recited elements or features. For example, the phrases "at

least one of A and B;" "one or more of A and B;" and "A and/or B" are each intended to mean "A alone, B alone, or A and B together." A similar interpretation is also intended for lists including three or more items. For example, the phrases "at least one of A, B, and C;" "one or more of A, B, and C;" and "A, B, and/or C" are each intended to mean "A alone, B alone, C alone, A and B together, A and C together, B and C together, or A and B and C together." In addition, use of the term "based on," above and in the claims is intended to include, "based at least in part on," such that an un-recited feature or element is also permissible.

0097 Some portions of the detailed descriptions are presented in terms of algorithms and symbolic representations of operations on data bits within a computer memory. These algorithmic descriptions and representations are the means used by those skilled in the video processing arts to convey the substance of their work most effectively to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities.

0098 It should be borne in mind, however, that these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise, as apparent from the above discussion, it is appreciated that throughout the description, discussions utilizing terms such as "receiving", "providing", "transmitting", "determining", "generating", "executing", or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

0099 Examples described also relate to an apparatus for performing the methods described. This apparatus may be specially constructed for performing the methods described, or it may comprise a digital processor, a memory module coupled to the digital processor and a network interface comprising wireless connectivity and coupled to the digital processor. The apparatus and system of embodiments provide a general-purpose computer system selectively programmed by a computer program stored in the computer system. Such a computer program may be stored in a computer-readable tangible storage medium.

0100 The methods and illustrative examples described are not inherently related to any particular computer or other apparatus. Various, general purpose systems may be used under the teachings described, or it may prove convenient to construct more specialized apparatus to perform methods 300 and 500 and/or each of its individual functions, routines, subroutines, or operations. Examples of the structure for a variety of these systems are in the description above.

0101 Whereas many alterations and modifications of the disclosure will become apparent to a person of ordinary skill in the art after having read the foregoing description, it is to be understood that any particular implementation shown and described by way of illustration is not intended to be considered limiting. Therefore, references to details of various implementations are not intended to limit the scope of the claims, which in themselves recite only those features regarded as the disclosure.

0102 In the foregoing specification, embodiments of the invention have been described referring to numerous specific details that may vary from implementation to implementation. The specification and drawings are, to be regarded in an illustrative rather than a restrictive sense. The sole and exclusive indicator of the scope of the invention, and what is intended by the applicants to be the scope of the invention, is the literal and equivalent scope of the set of claims that issue from this application, in the specific form in which such claims issue, including any subsequent correction.

CLAIMS:

1. A self-serve food locker assembly to order, receive, house, and deliver takeout food to a designated recipient, the assembly comprising:

A) a digital processor, a memory module coupled to the digital processor, and a network interface coupled to the digital processor, the network interface comprising wireless connectivity;

B) at least one food locker comprising: i) internal LED lighting, ii) internal ultra-violet lighting, iii) at least one touchless food locker door comprising a linear drive, the locker door further comprising: iv) at least one integrated human-machine interface screen coupled to the digital processor via the network interface, v) a food locker interior surface lined with 2400-degree Fahrenheit heat resistant thermal insulation, and vi) at least one sensor configured to monitor an interior space of each food locker;

C) an external integrated heating assembly and a refrigeration assembly for preserving the recipient's takeout food housed within the at least one food locker; and

D) a power drawer comprising a main AC power connection: the power drawer further comprising an interface for: the digital processor, the at least one sensor, the ultra-violet lighting, the at least one human-machine interface screen, on/off circuit breakers with an integrated power switch, and a battery backup switch for emergency access to the at least one food locker;

wherein the memory module stores programmed instructions which, when executed by the digital processor, cause the at least one digital human-machine interface screen to: i) display that food has been placed into the locker when the at

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least one sensor detects that takeout food is placed into the food locker, ii) display that food has been removed from the food locker when the at least one sensor detects that takeout food is removed from the food locker, and iii) indicate when a predetermined wait time for removing food elapses for a loaded food locker.

2. The assembly of claim 1, further comprising a modular array of self-serve food locker assemblies, the modular array suitable to be built into a wall between a kitchen environment and a public space, whereby each self-serve food locker assembly comprises linear drive hardware on the food locker door, and comprises touchless access to the food from both the kitchen environment and the public space.

3. The assembly of claim 1, further comprising a modular array of self-serve food locker assemblies, the modular array suitable to be built into a wall between a kitchen environment and a public space, whereby each self-serve food locker assembly comprises linear drive hardware on the food locker door, and comprises touchless access to the food from the public space.

4. The assembly of claim 2, further comprising at least one technology tower station comprising: i) a user interface touch screen panel, ii) a bar code scanner, iii) a quick response code scanner, and iv) wireless connectivity, and wherein the side, front, rear, and top surfaces of the technology tower station comprise food grade stainless steel or powder coated finish.

5. The assembly of claim 4, wherein each touchless food locker door further comprises a safety light curtain sensor transmitter and a safety light curtain sensor receiver.

6. The assembly of claim 5, wherein each touchless food locker door further comprises dual paned insulated glass with UV blocking film coating.

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7. The assembly of claim 6, wherein each touchless food locker door further comprises; i) a food locker door electronic control of each linear food drive, ii) food locker interior lighting, iii) food locker ultra-violet lighting, and iv) a door safety interlock module.

8. The assembly of claim 7, wherein each touchless food locker door further comprises an RFID sensor and a fingerprint sensor for kitchen access.

9. A self-serve food locker assembly comprising, in combination:

A) a digital microprocessor, a memory module coupled, and a network interface comprising wireless connectivity, the memory module and the network interface coupled to the digital microprocessor;

B) at least one food locker comprising: i) internal lighting, i i) internal ultra-violet lighting, iii) at least one food locker door that provides at least one integrated human-machine interface screen, the integrated human-machine interface screen coupled to the digital microprocessor via the network interface, iv) a food locker interior surface lined with 2400-degree Fahrenheit heat resistant thermal insulation, v) dual-paned insulated glass with UV blocking film coating, and vi) a plurality of sensors within the food locker interior space to monitor the interior space of each food locker;

C) an external integrated heating assembly and refrigeration assembly for preserving a recipient's takeout food order housed within an interior space of the at least one food locker;

D) a power drawer comprising a main AC power connection that includes an interface for: i) the digital processor, ii) the at least one sensor, iii) the internal ultra-violet and internal lighting, iv) the at least one human machine interface screen, v) on/off circuit breakers that include an

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integrated power switch, and vi) a battery backup switch for emergency access to the at least one food locker;

E) a touchless linear assembly drive for the at least one food locker door, the touchless linear assembly comprising, in combination: i) a motorized linear actuator; ii) an adjustable field serviceable linear actuator mounting assembly; iii) a linear actuator tension/compression assembly; and iv) an electro-mechanical solenoid lock providing access to the food locker interior space;

F) at least one technology tower station comprising: i) a user interface comprising a touch screen panel, ii) a bar code scanner, iii) a quick response code scanner, iv) wireless connectivity, and wherein side, front, rear, and top surfaces of the technology tower station comprise a food grade stainless steel or powder-coated finish;

G) the digital microprocessor is further configured to control a temperature of the at least one food locker interior space;

H) some of the plurality of sensors within the food locker interior space are provided at various access points within the food locker interior space for measuring food locker interior space temperature, an object's presence in the food locker interior space, and food locker door status;

I) some of the lighting assemblies and UV lighting assemblies are within the food locker interior space; and

J) wherein the memory module stores programmed instructions which, when executed using the digital processor, causes the at least one human-machine interface screen to: i) display that food has been placed into the food locker when at least one sensor detects that food is place into the food locker, ii) display that food has been removed from the food

locker, or iii) indicate after a predetermined time elapses for a loaded food locker.

10. The assembly of claim 9, further comprising a modular array of self-serve food locker assemblies, the modular array suitable to be built into a wall between a kitchen environment and a public space, whereby each self-serve food locker assembly comprises linear drive hardware on the food locker door and comprises touchless access to the food from both the kitchen environment and the public space.

11. The assembly of claim 9, further comprising a modular array of self-serve food locker assemblies, the modular array suitable to be built into a wall between a kitchen environment and a public space, whereby each self-serve food locker assembly comprises linear drive hardware on the food locker door and comprises touchless access to the food from the public space.

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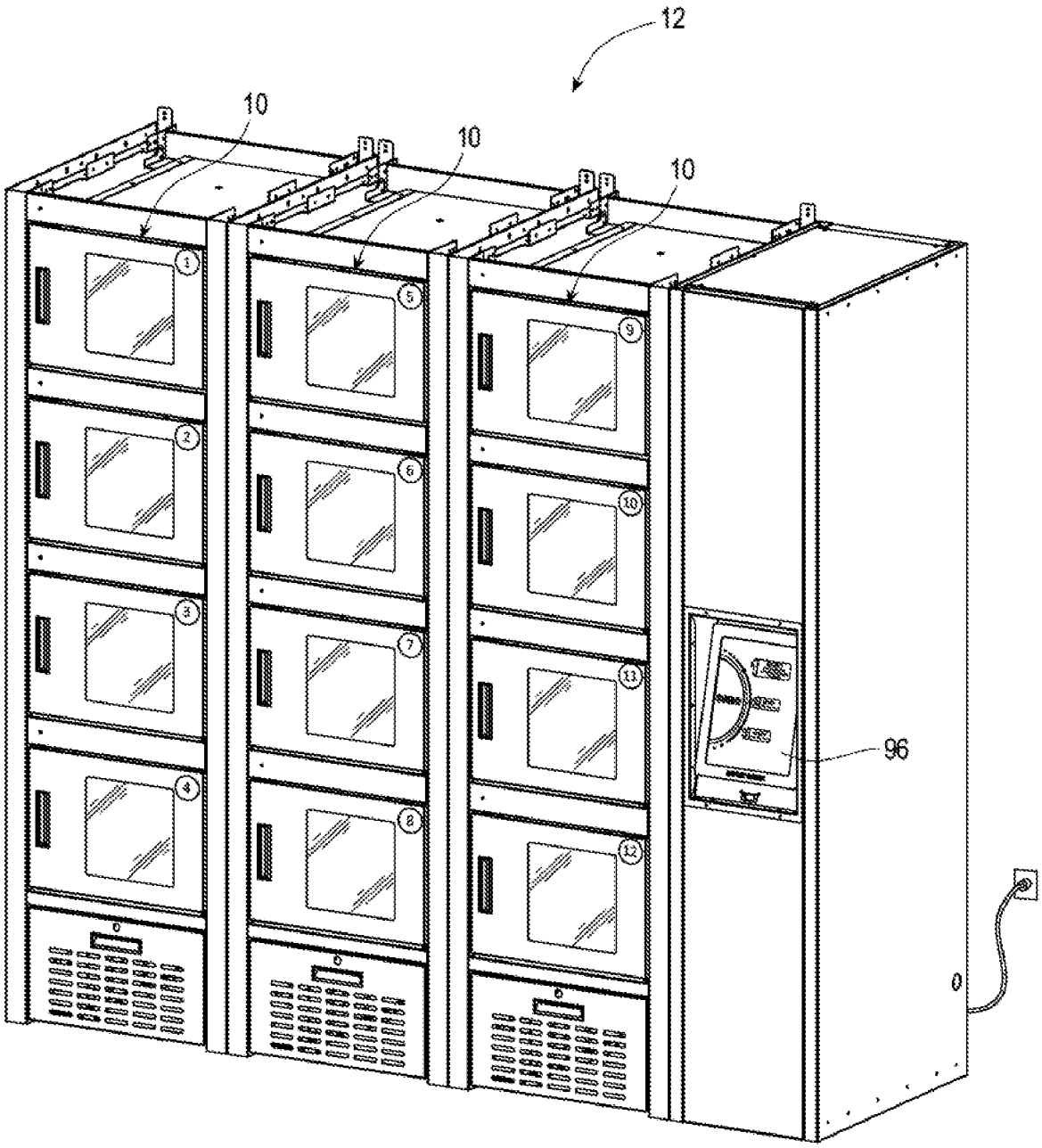


FIG. 1

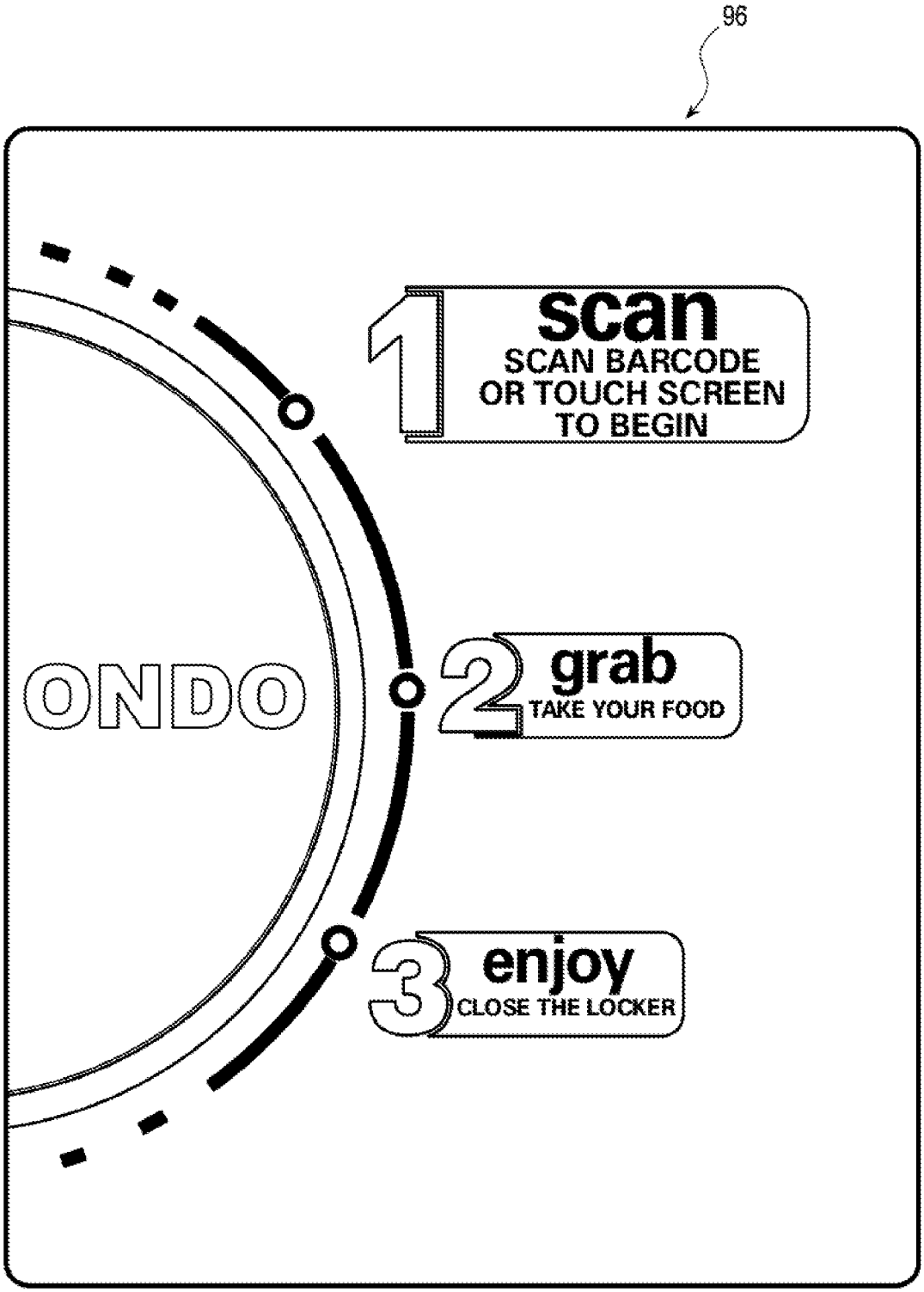

96
1 scan
SCAN BARCODE
OR TOUCH SCREEN
TO BEGIN
ONDO
2 grab
TAKE YOUR FOOD
3 enjoy
CLOSE THE LOCKER

FIG. 2

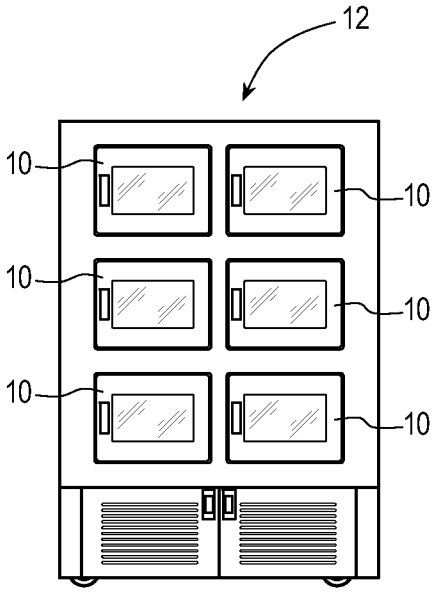


FIG. 3A

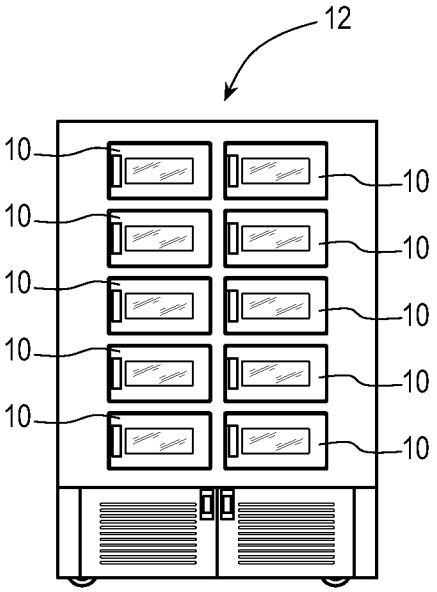


FIG. 3C

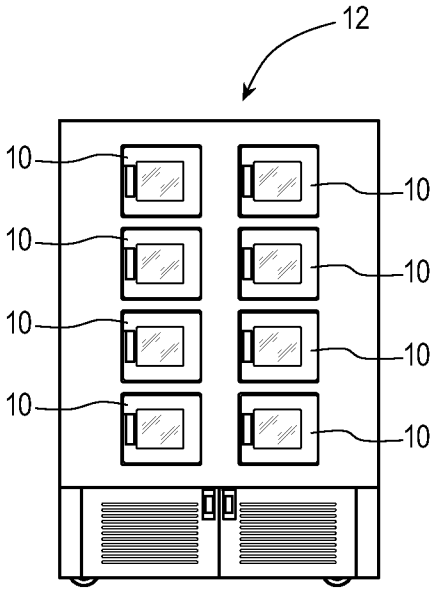


FIG. 3B

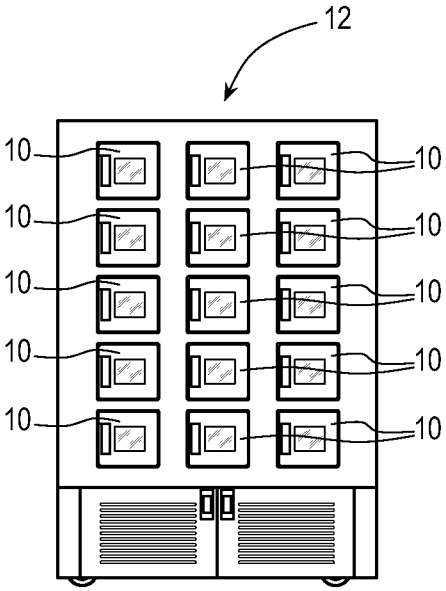


FIG. 3D

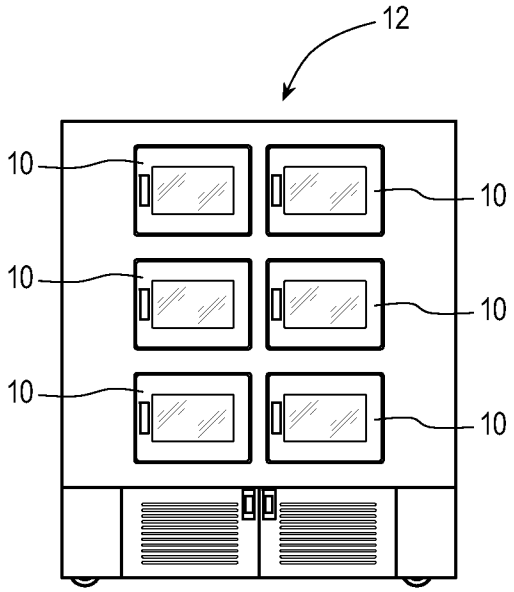


FIG. 4A

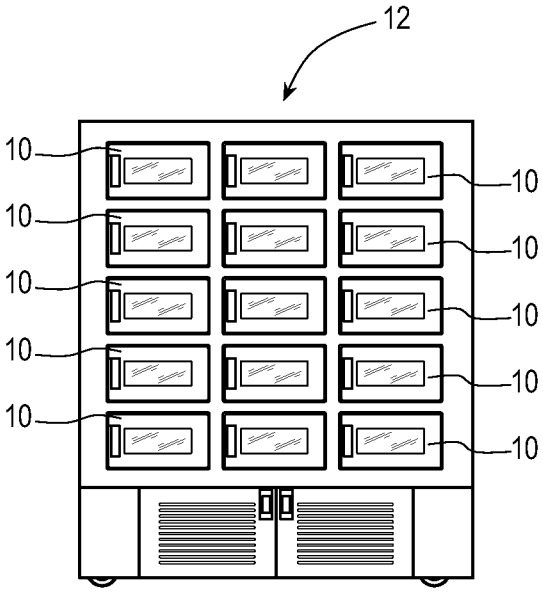


FIG. 4C

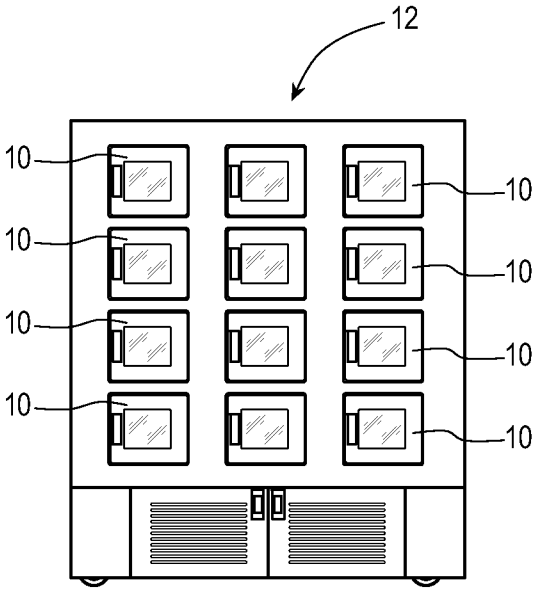


FIG. 4B

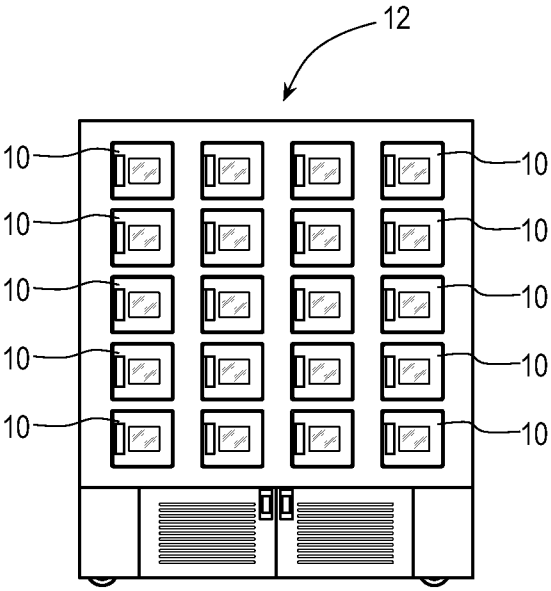


FIG. 4D

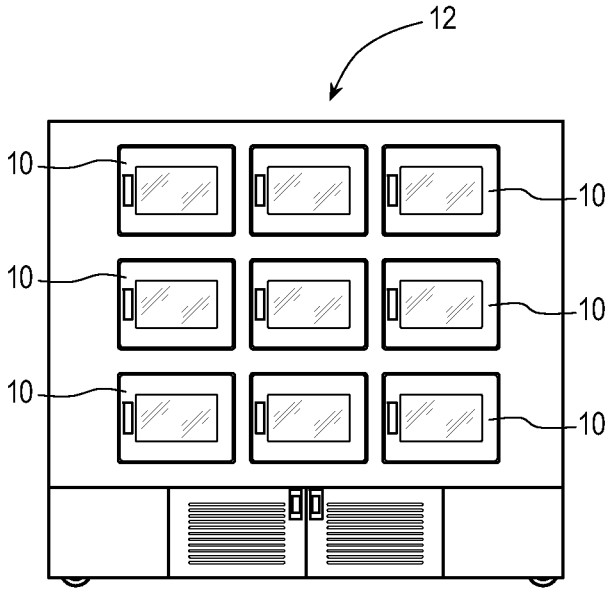


FIG. 5A

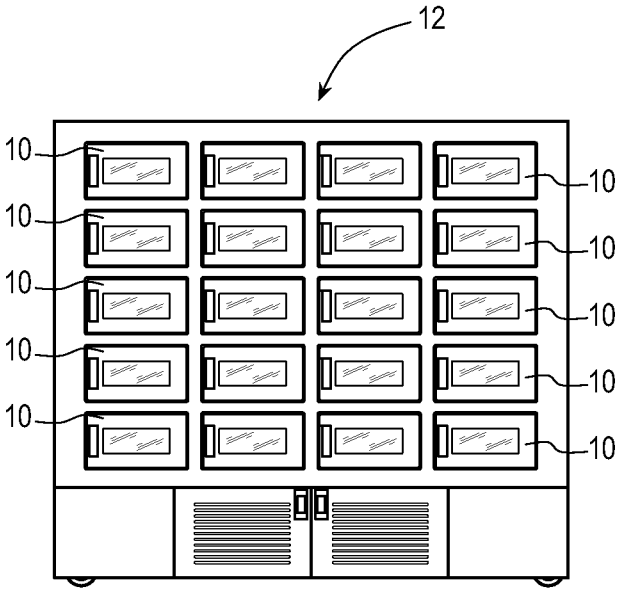


FIG. 5C

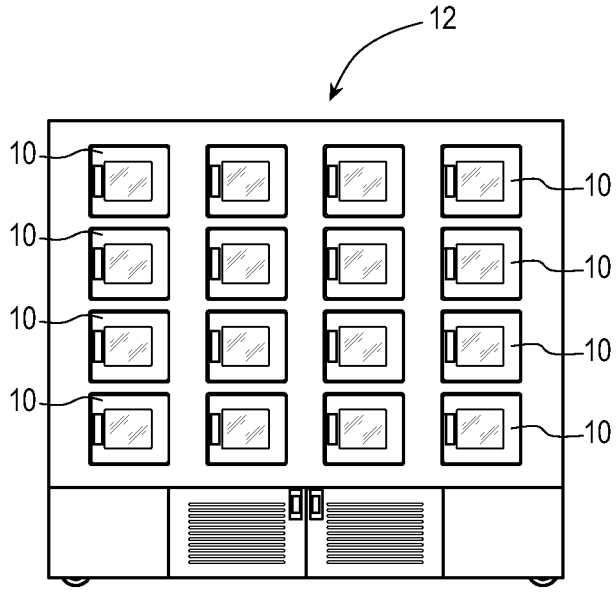


FIG. 5B

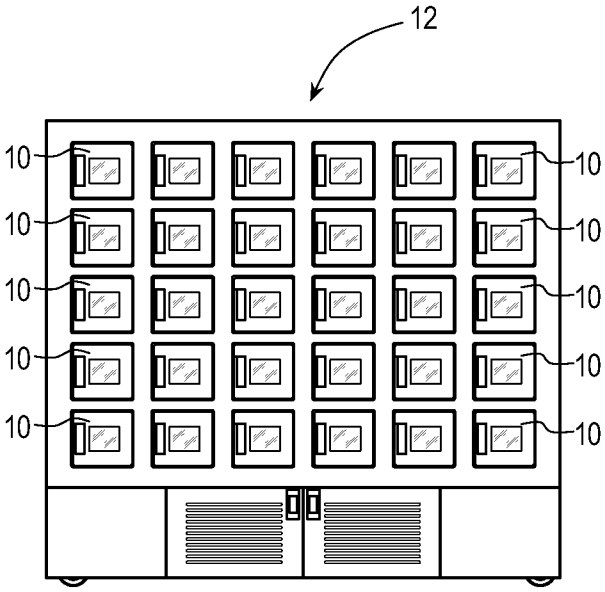


FIG. 5D

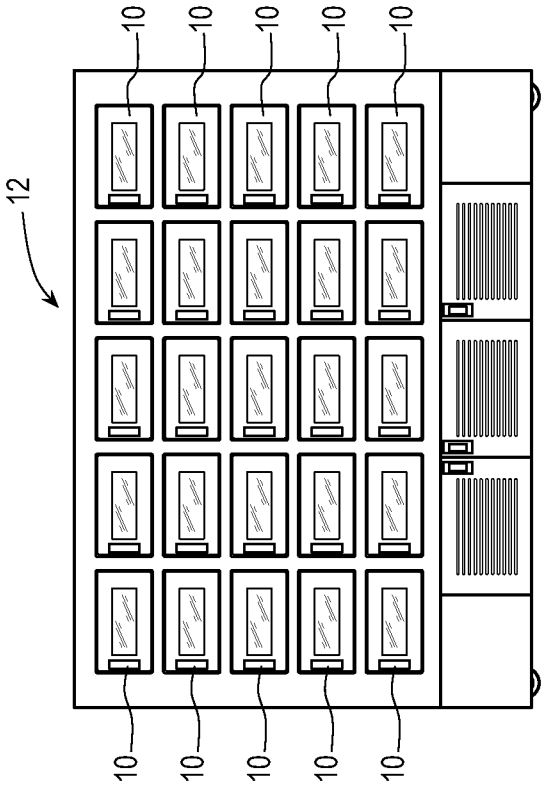


FIG. 6C

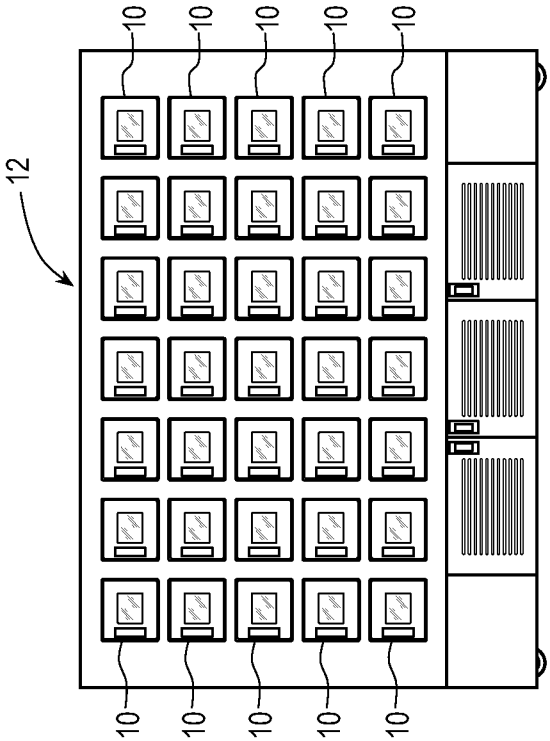


FIG. 6D

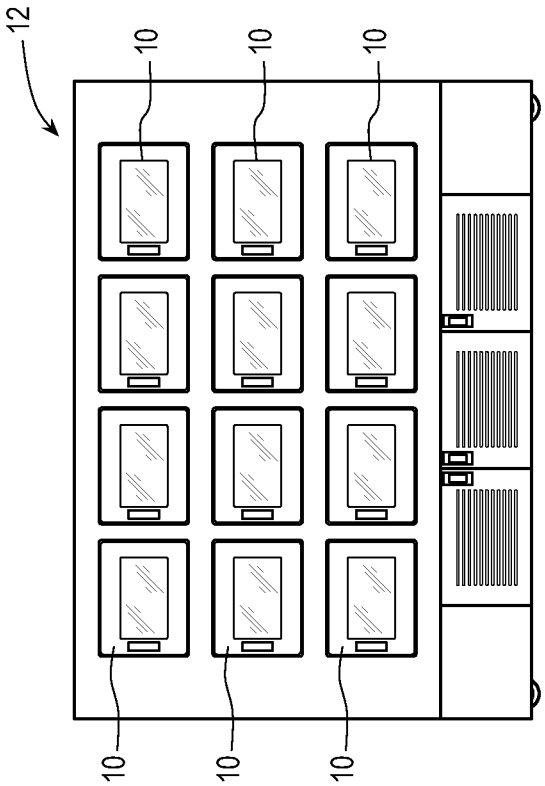


FIG. 6A

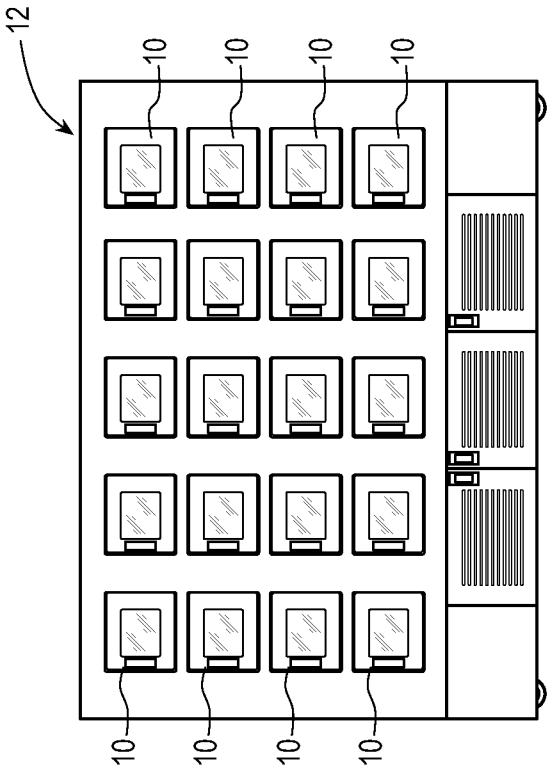


FIG. 6B

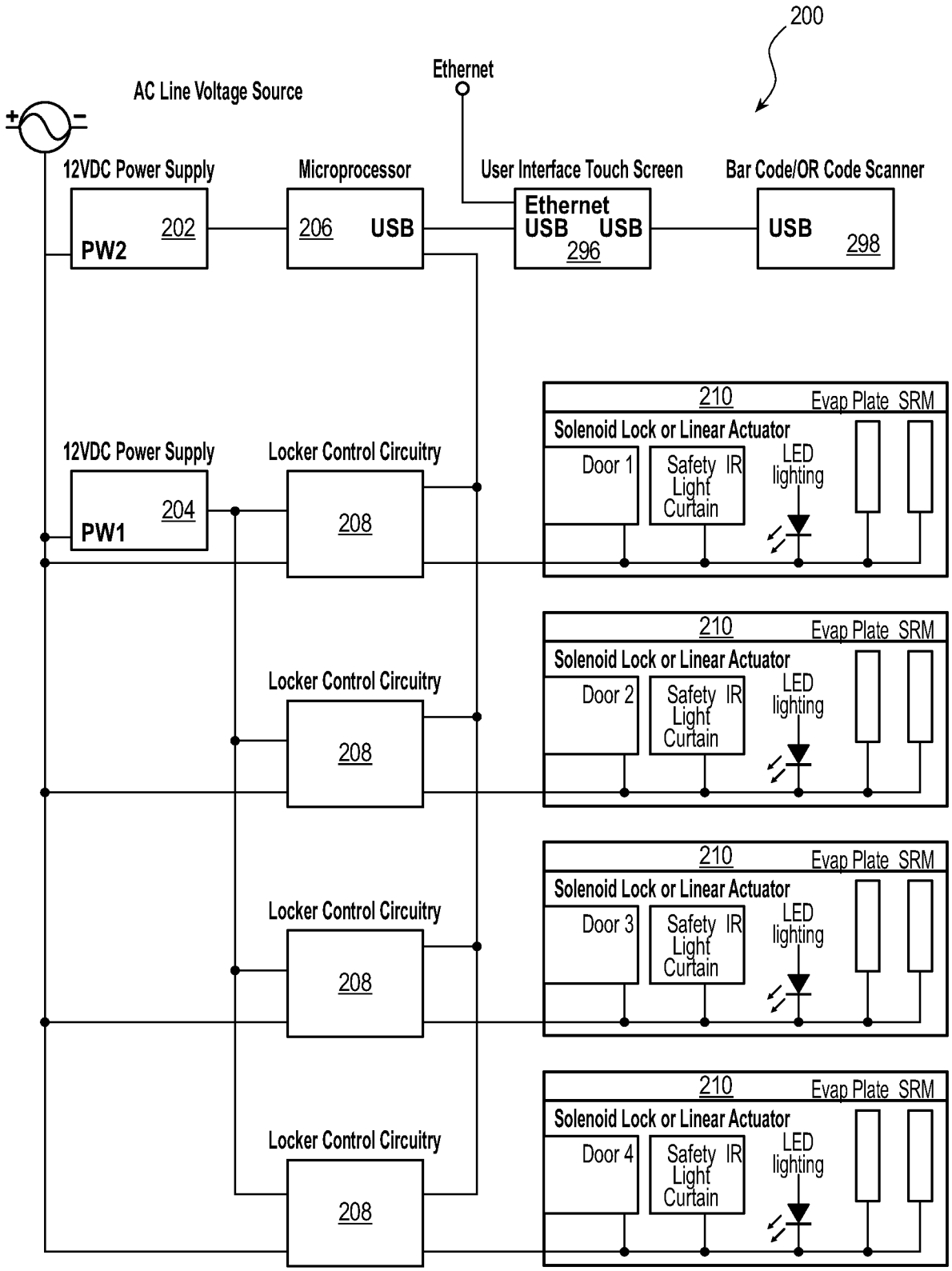

200
Ethernet
AC Line Voltage Source
12VDC Power Supply
Microprocessor
User Interface Touch Screen
Bar Code/OR Code Scanner
202
PW2
206
USB
Ethernet
USB
USB
296
USB
298
210
Evap Plate SRM
Solenoid Lock or Linear Actuator
Door 1
Safety IR Light Curtain
LED lighting
12VDC Power Supply
Locker Control Circuitry
204
PW1
208
Door 2
Door 3
Door 4

FIG. 7

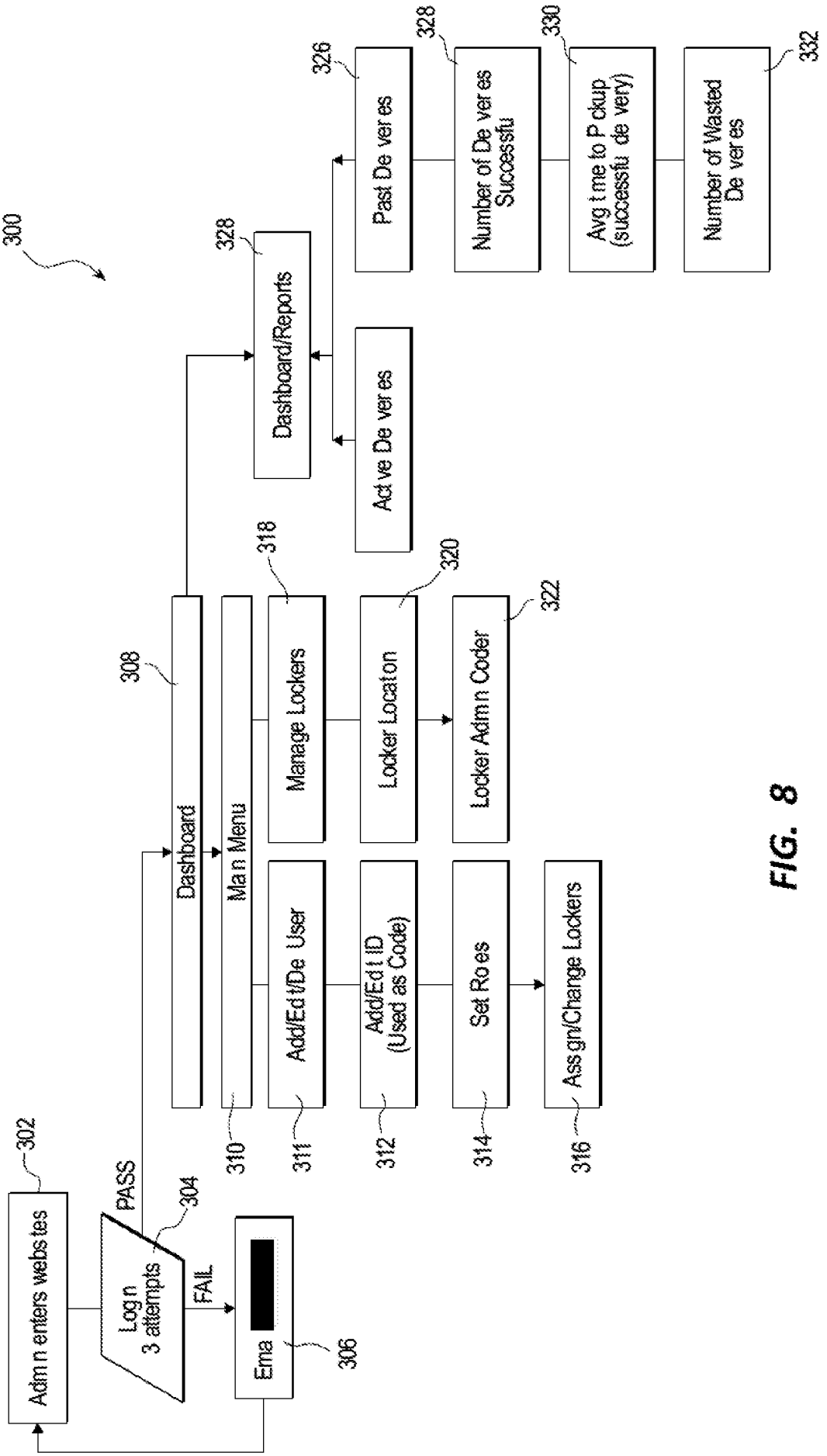

300
Admn enters webstes
302
Logn
3 attempts
304
PASS
FAIL
Ema
306
Dashboard
308
Man Menu
310
Add/Edt/De User
311
Manage Lockers
318
Add/Edt ID
(Used as Code)
312
Locker Locaton
320
Set Roes
314
Locker Admn Coder
322
Assgn/Change Lockers
316
Dashboard/Reports
328
Past Deveres
326
Number of Deveres
Successfu
328
Avg tme to Pckup
(successfu dekvery)
330
Number of Wasted
Deveres
332
Actve Deveres

FIG. 8

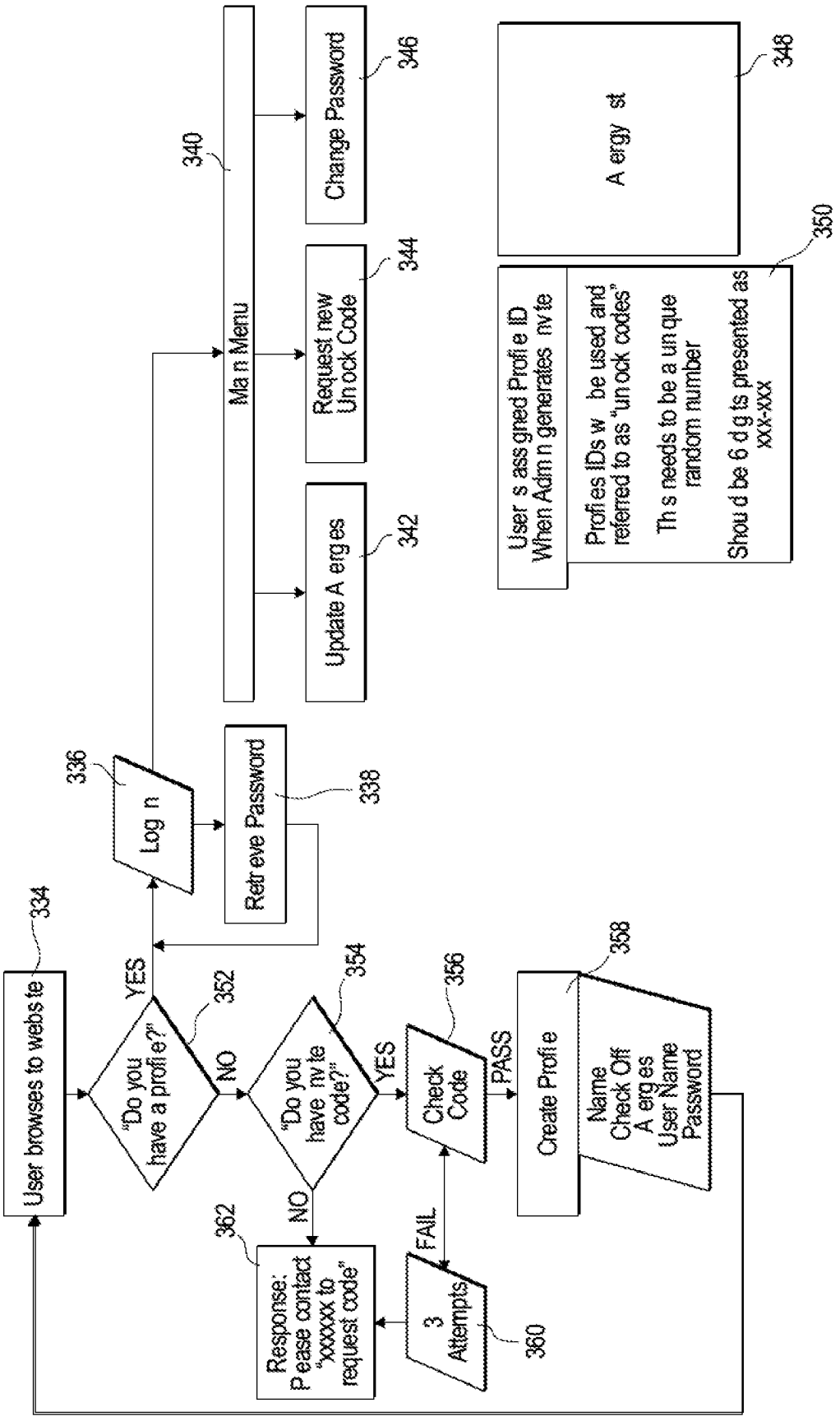

User browses to webs te
334
"Do you have a profi e?"
352
YES
NO
Log n
336
Retr eve Password
338
"Do you have nv te code?"
354
YES
NO
Check Code
356
PASS
FAIL
3 Attempts
360
Response: P ease contact "xxxxx to request code"
362
Create Profi e
358
Name
Check Off A erg es
User Name
Password
Ma n Menu
340
Update A erg es
342
Request new Un ock Code
344
Change Password
346
A erg y st
348
User s ass gned Profi e ID When Adm n generates nv te
Profi es IDs w be used and referred to as "un ock codes"
Th s needs to be a un que random number
Shou d be 6 d g ts presented as xxx-xxx
350

FIG. 9

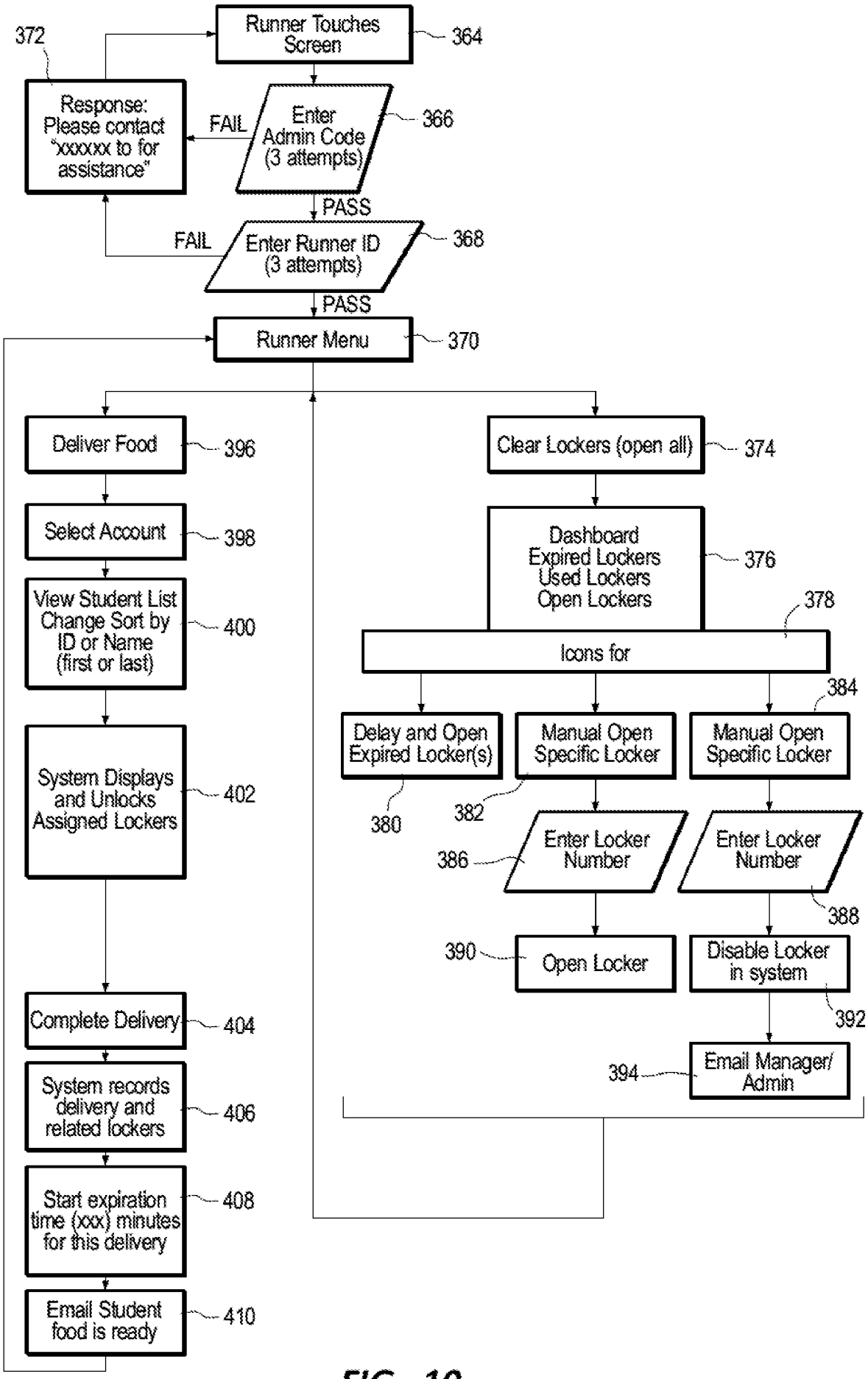

Runner Touches Screen
364
372
Response: Please contact "xxxxx to for assistance"
FAIL
Enter Admin Code (3 attempts)
366
PASS
FAIL
Enter Runner ID (3 attempts)
368
PASS
Runner Menu
370
Deliver Food
396
Select Account
398
View Student List Change Sort by ID or Name (first or last)
400
System Displays and Unlocks Assigned Lockers
402
Complete Delivery
404
System records delivery and related lockers
406
Start expiration time (xxx) minutes for this delivery
408
Email Student food is ready
410
Clear Lockers (open all)
374
Dashboard Expired Lockers Used Lockers Open Lockers
376
378
Icons for
384
Delay and Open Expired Locker(s)
Manual Open Specific Locker
Manual Open Specific Locker
380
382
Enter Locker Number
386
Enter Locker Number
388
390
Open Locker
Disable Locker in system
392
394
Email Manager/ Admin

FIG. 10

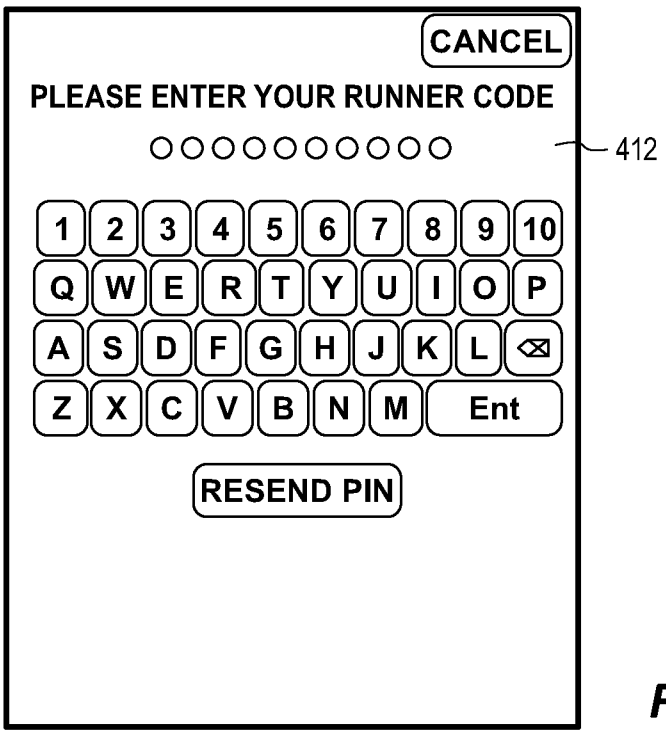


FIG. 11A

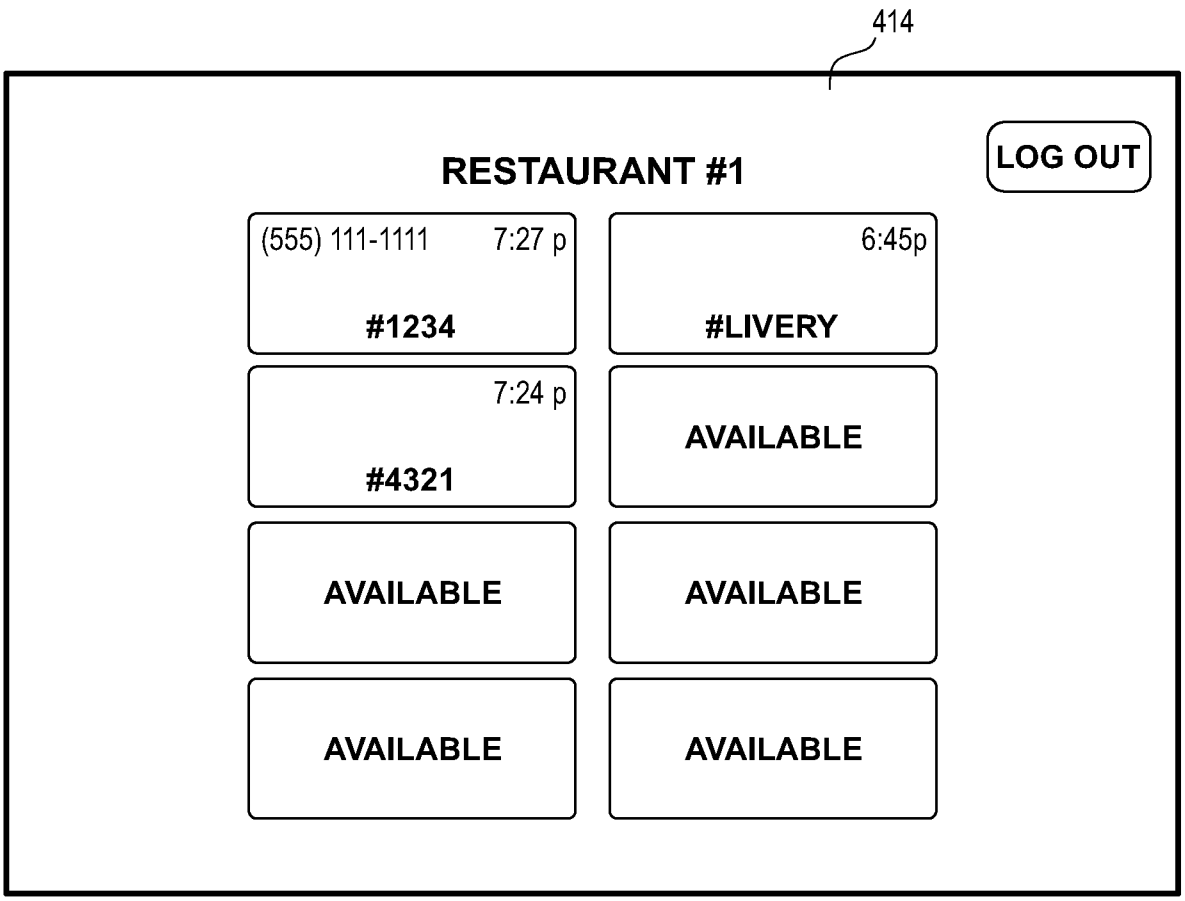


FIG. 11B

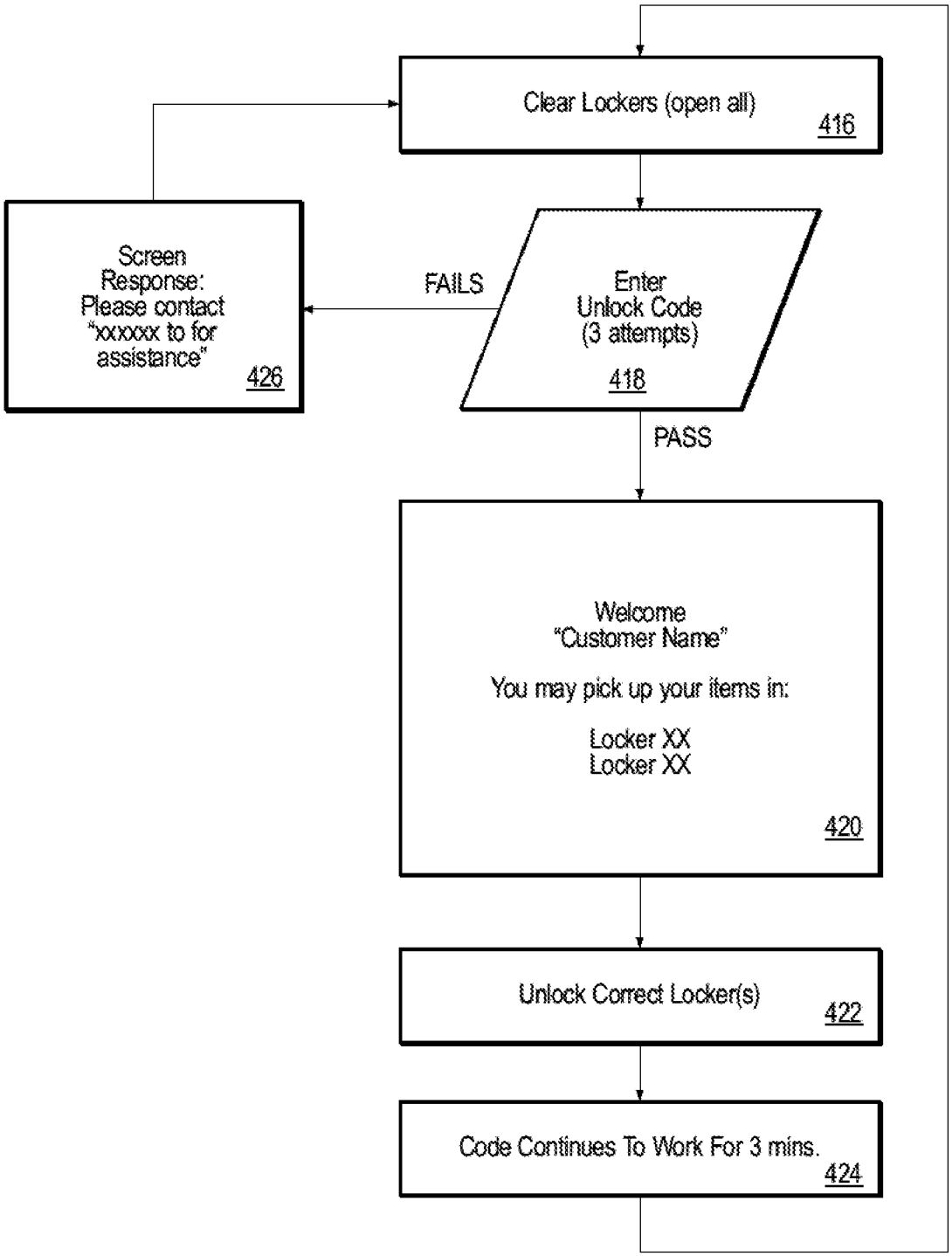

Clear Lockers (open all)
416
Enter
Unlock Code
(3 attempts)
418
FAILS
Screen
Response:
Please contact
"xxxxx to for
assistance"
426
PASS
Welcome
"Customer Name"
You may pick up your items in:
Locker XX
Locker XX
420
Unlock Correct Locker(s)
422
Code Continues To Work For 3 mins.
424

FIG. 12

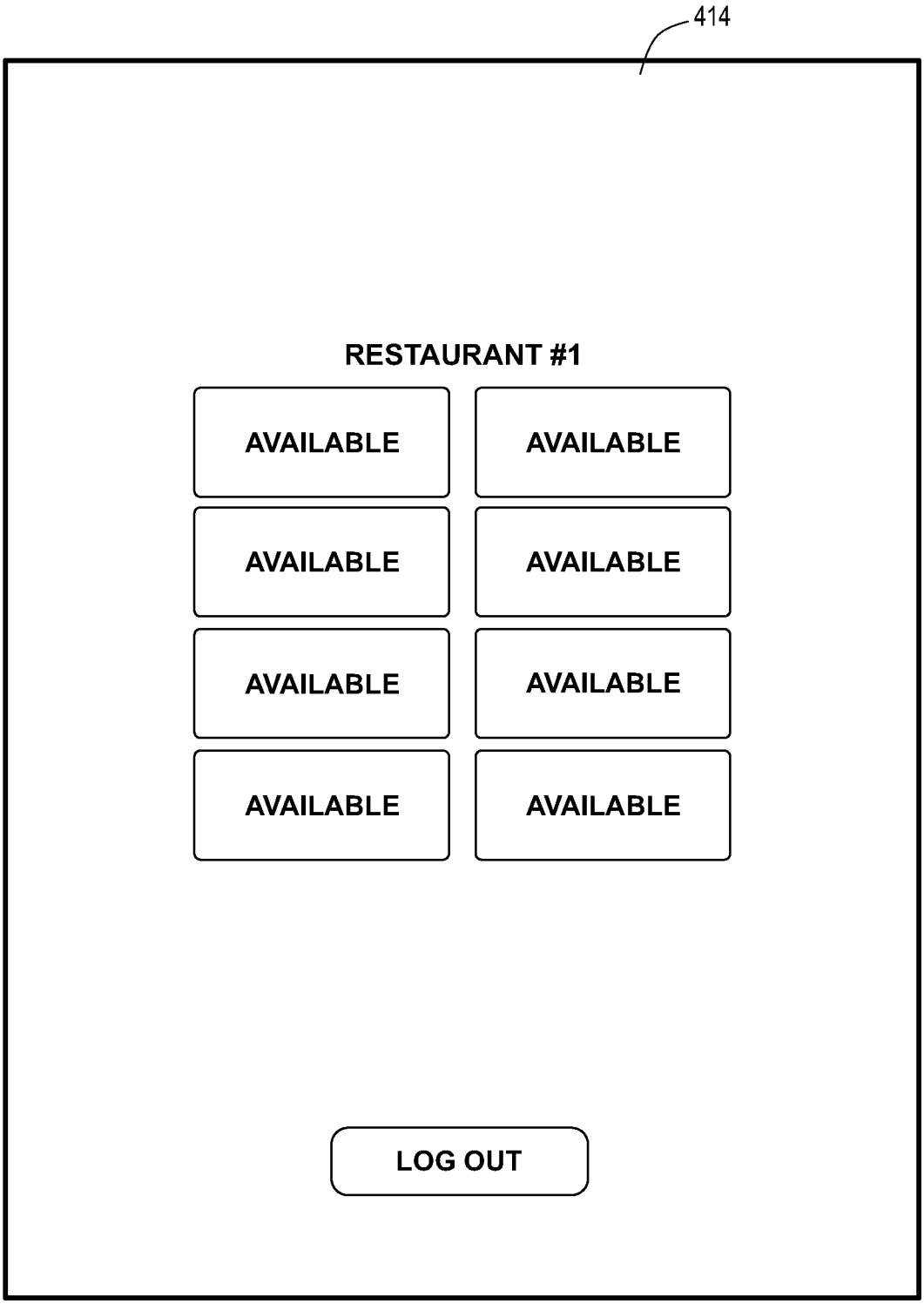

414
RESTAURANT #1
AVAILABLE
AVAILABLE
AVAILABLE
AVAILABLE
AVAILABLE
AVAILABLE
AVAILABLE
AVAILABLE
LOG OUT

FIG. 13

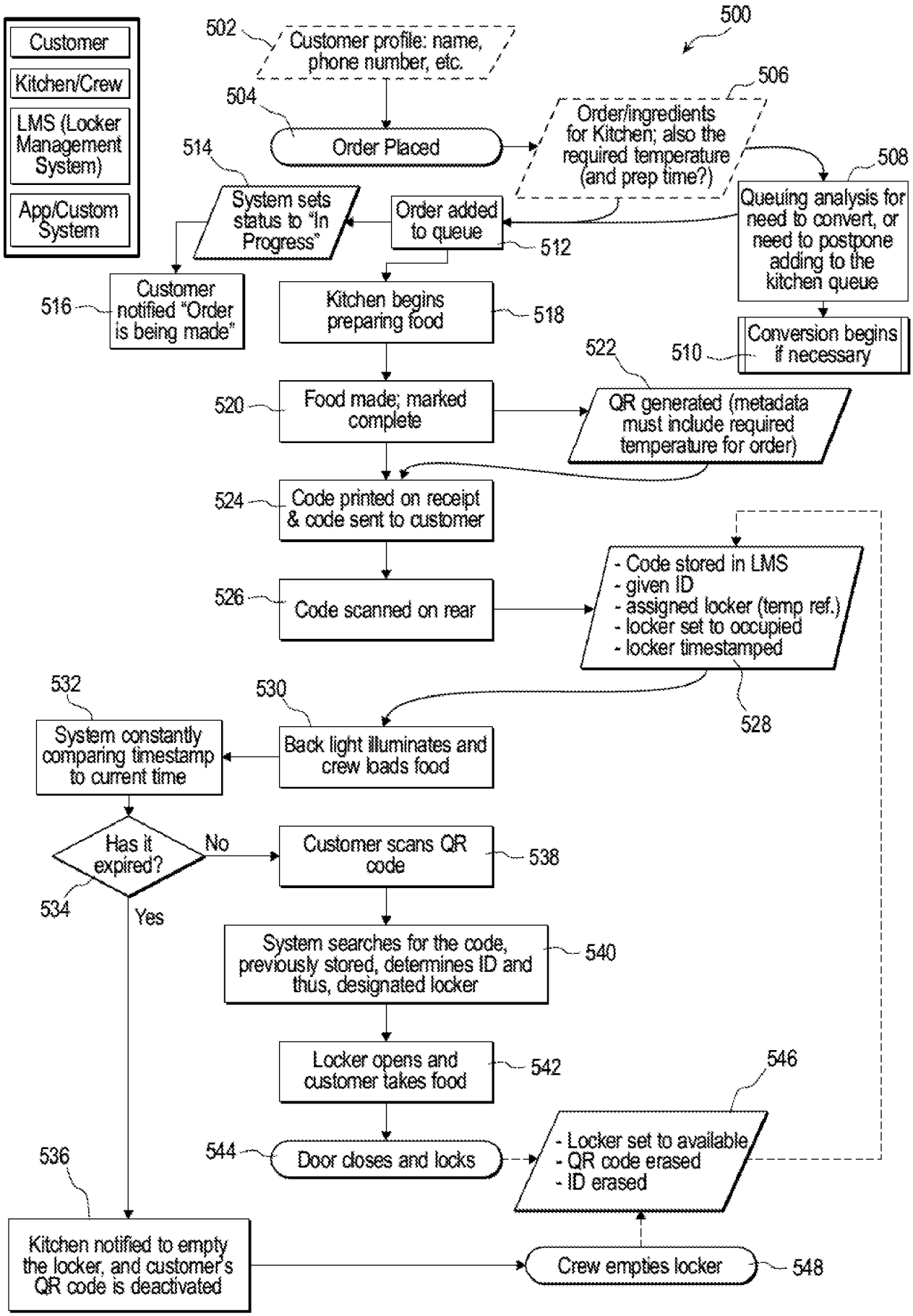

Customer
Kitchen/Crew
LMS (Locker Management System)
App/Custom System
500
502
Customer profile: name, phone number, etc.
504
Order Placed
506
Order/ingredients for Kitchen; also the required temperature (and prep time?)
508
Queuing analysis for need to convert, or need to postpone adding to the kitchen queue
510
Conversion begins if necessary
512
Order added to queue
514
System sets status to "In Progress"
516
Customer notified "Order is being made"
518
Kitchen begins preparing food
520
Food made; marked complete
522
QR generated (metadata must include required temperature for order)
524
Code printed on receipt & code sent to customer
526
Code scanned on rear
- Code stored in LMS
- given ID
- assigned locker (temp ref.)
- locker set to occupied
- locker timestamped
528
530
Back light illuminates and crew loads food
532
System constantly comparing timestamp to current time
Has it expired?
No
Yes
534
538
Customer scans QR code
540
System searches for the code, previously stored, determines ID and thus, designated locker
542
Locker opens and customer takes food
544
Door closes and locks
546
- Locker set to available
- QR code erased
- ID erased
536
Kitchen notified to empty the locker, and customer's QR code is deactivated
548
Crew empties locker

FIG. 14

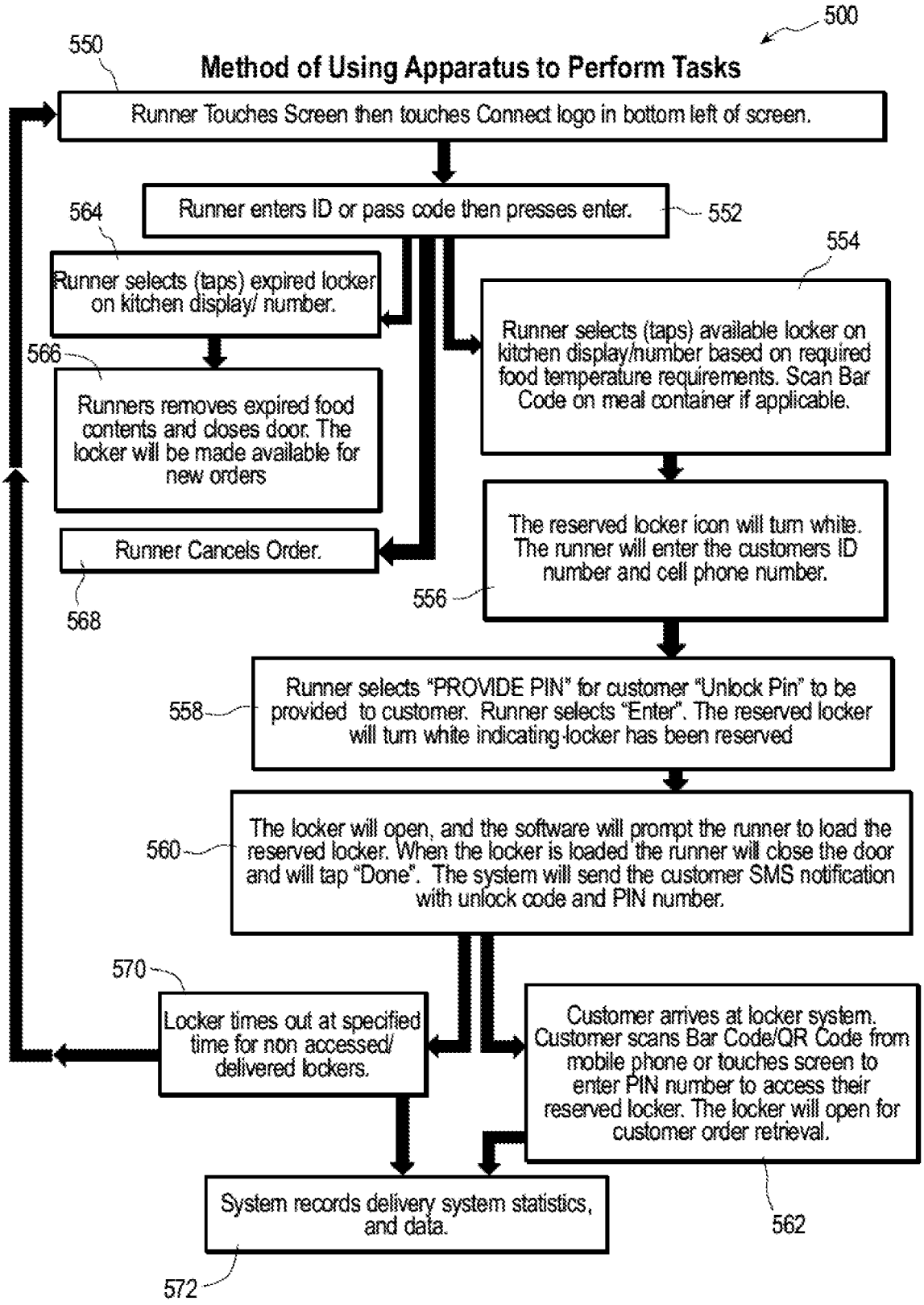

500
550
Method of Using Apparatus to Perform Tasks
Runner Touches Screen then touches Connect logo in bottom left of screen.
Runner enters ID or pass code then presses enter.
552
564
Runner selects (taps) expired locker on kitchen display/ number.
554
Runner selects (taps) available locker on kitchen display/number based on required food temperature requirements. Scan Bar Code on meal container if applicable.
566
Runners removes expired food contents and closes door. The locker will be made available for new orders
Runner Cancels Order.
568
The reserved locker icon will turn white. The runner will enter the customers ID number and cell phone number.
556
Runner selects "PROVIDE PIN" for customer "Unlock Pin" to be provided to customer. Runner selects "Enter". The reserved locker will turn white indicating locker has been reserved
558
The locker will open, and the software will prompt the runner to load the reserved locker. When the locker is loaded the runner will close the door and will tap "Done". The system will send the customer SMS notification with unlock code and PIN number.
560
570
Locker times out at specified time for non accessed/ delivered lockers.
Customer arrives at locker system. Customer scans Bar Code/QR Code from mobile phone or touches screen to enter PIN number to access their reserved locker. The locker will open for customer order retrieval.
562
System records delivery system statistics, and data.
572

FIG. 15

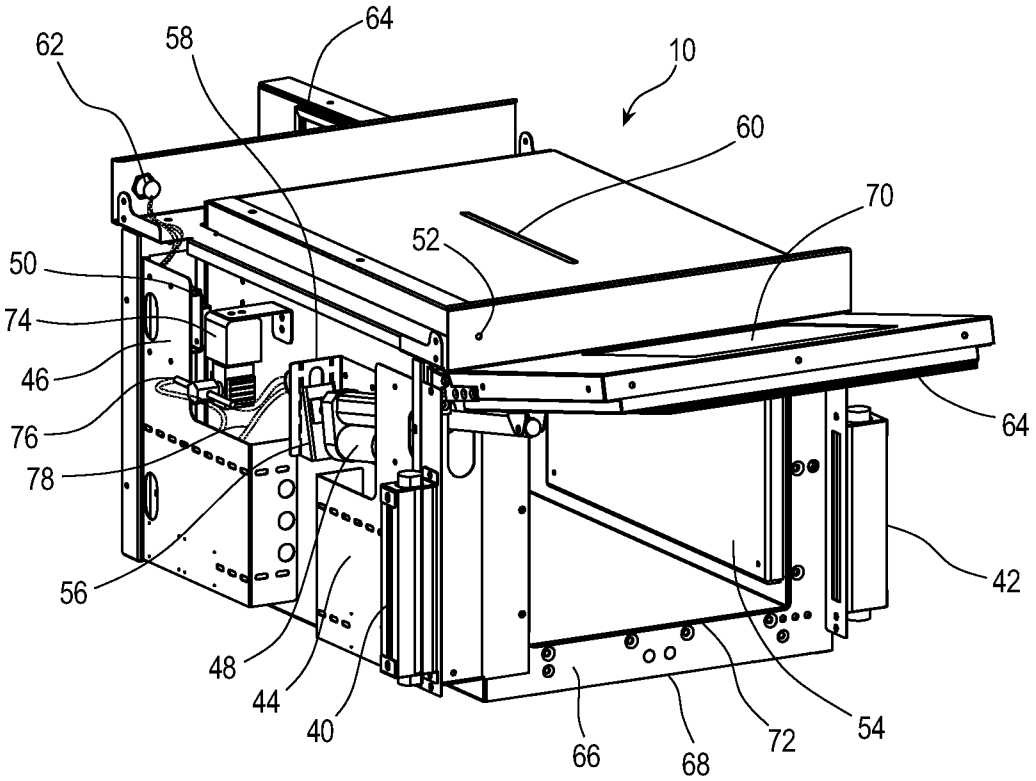


FIG. 16A

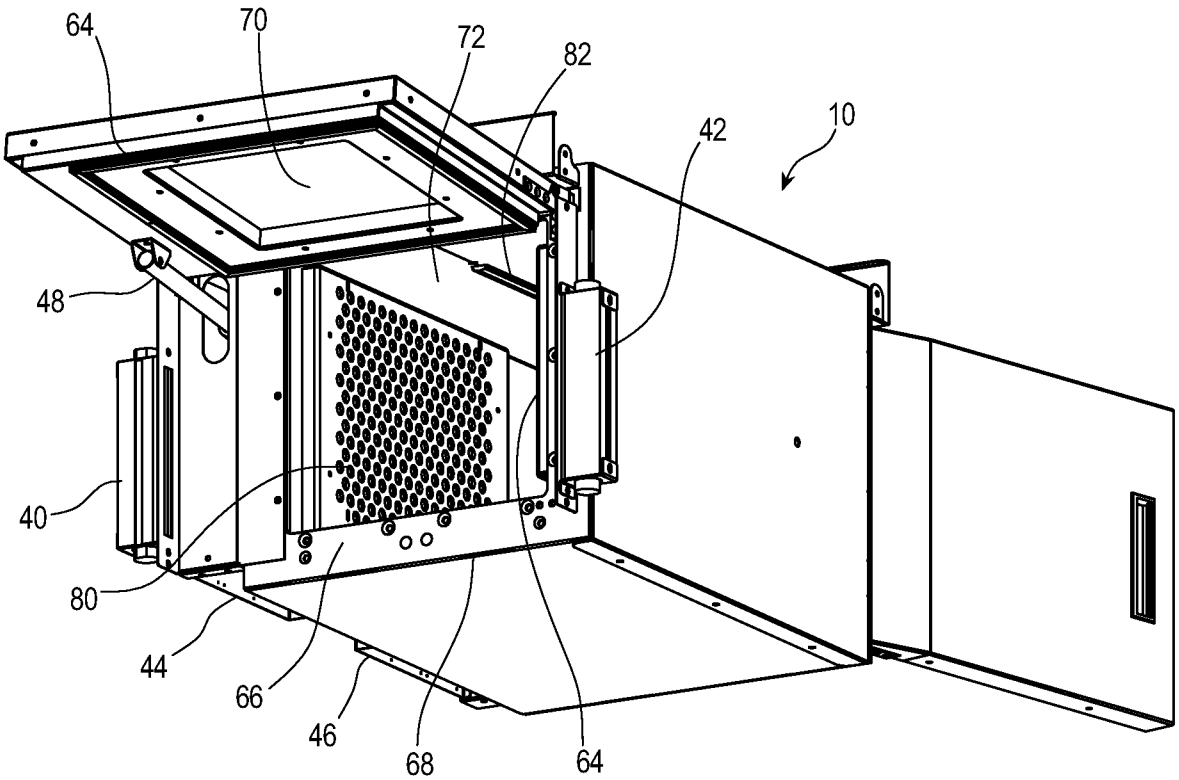


FIG. 16B

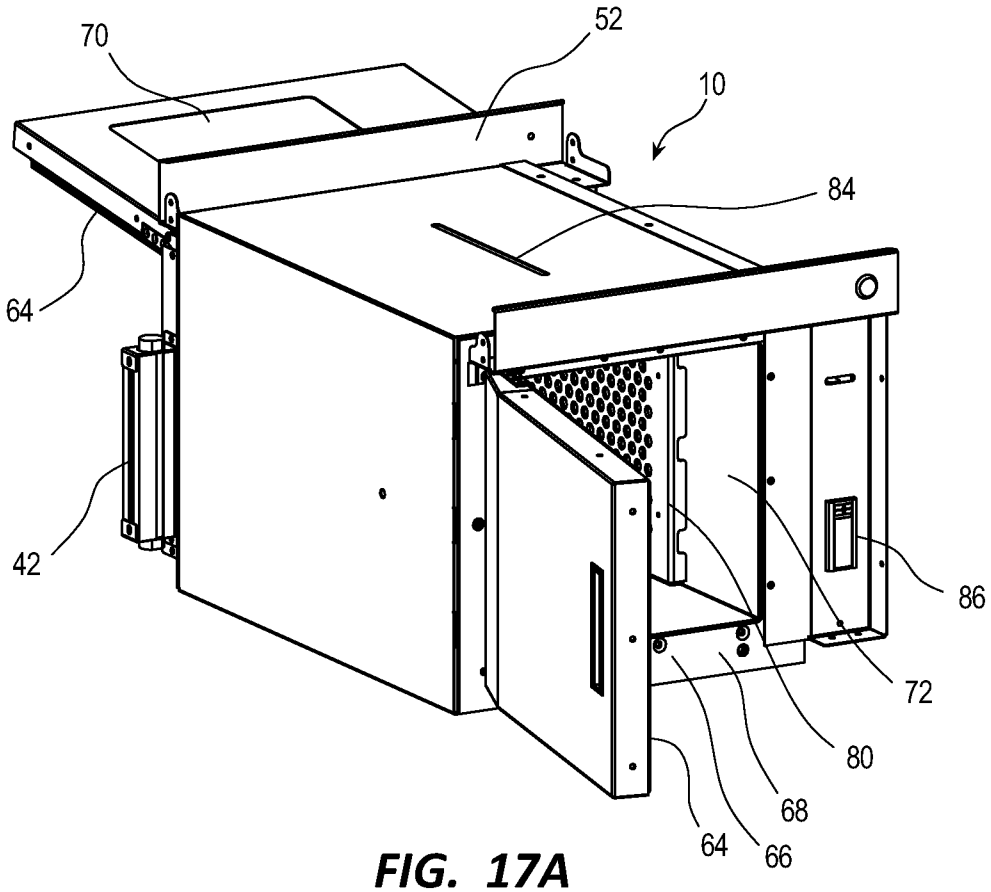


FIG. 17A

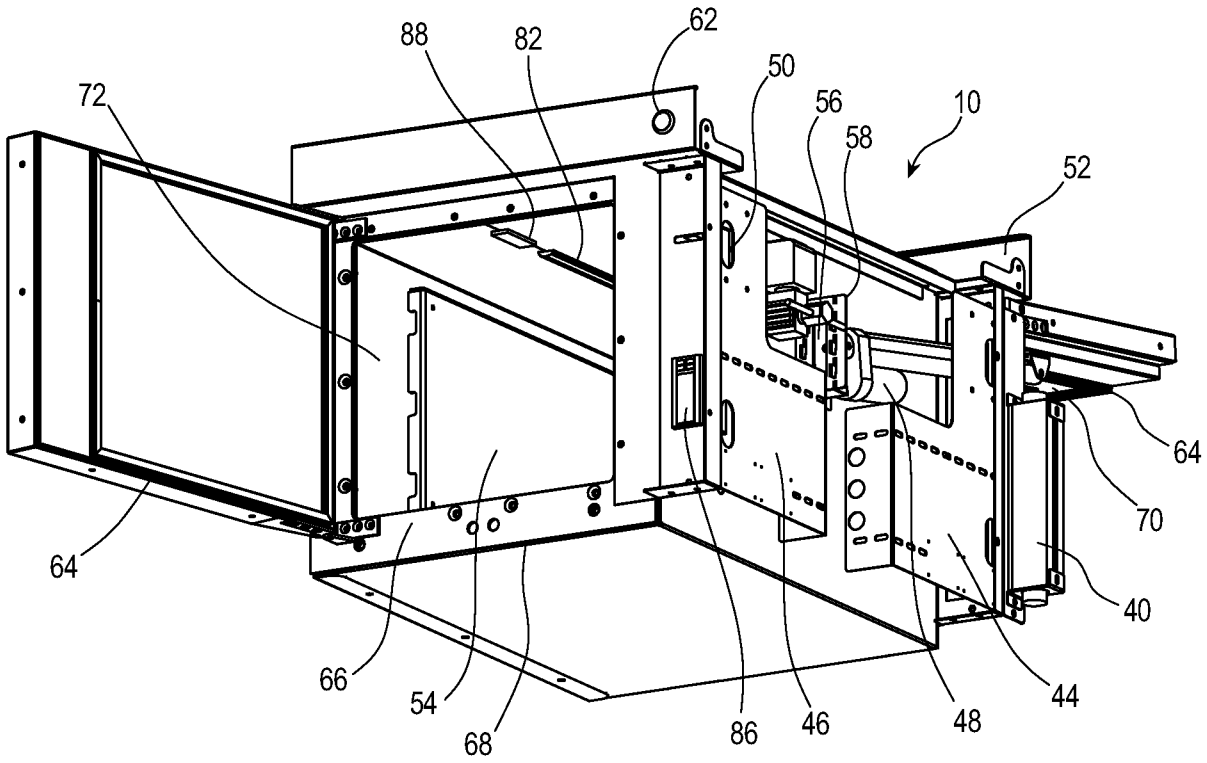


FIG. 17B

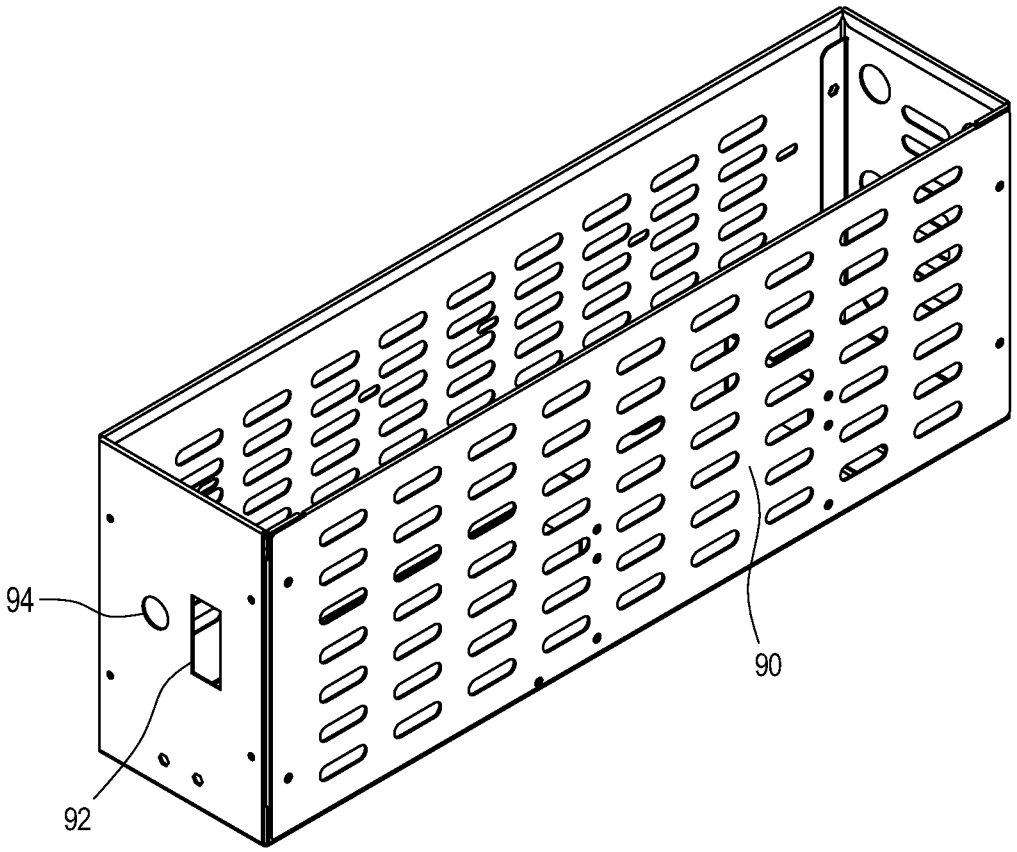


FIG. 18

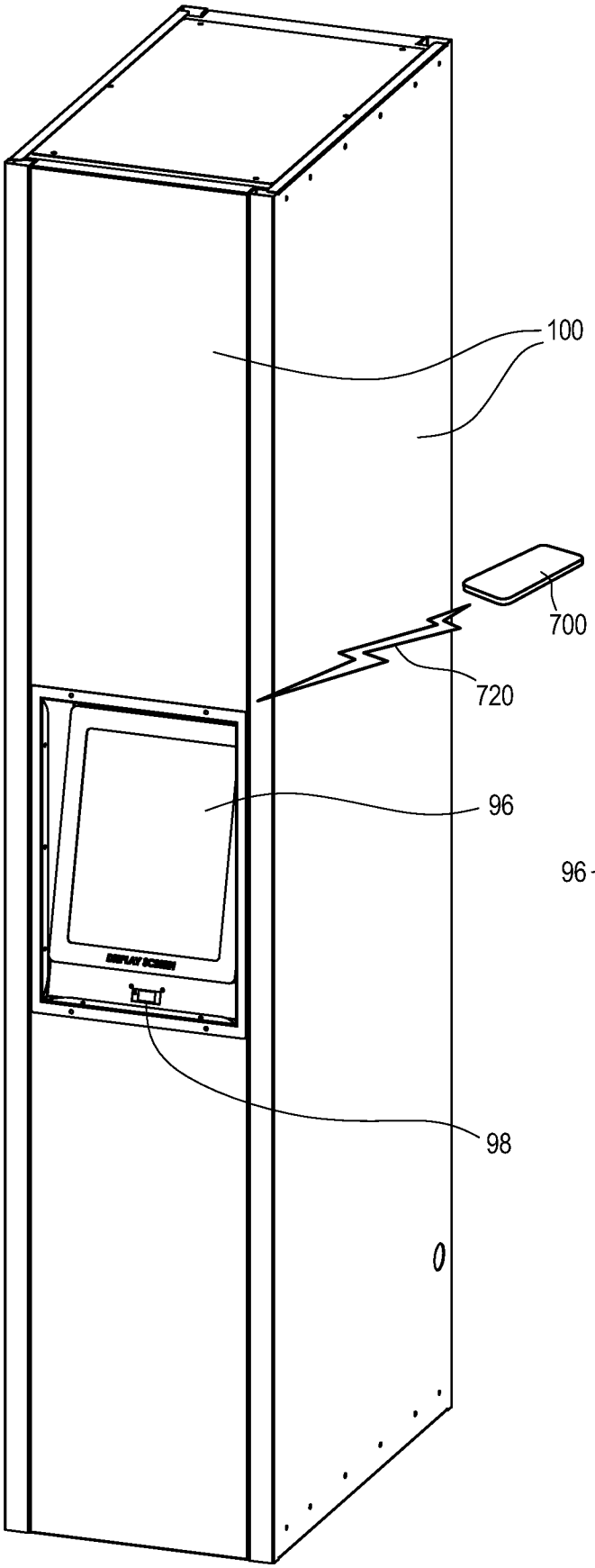


FIG. 19A

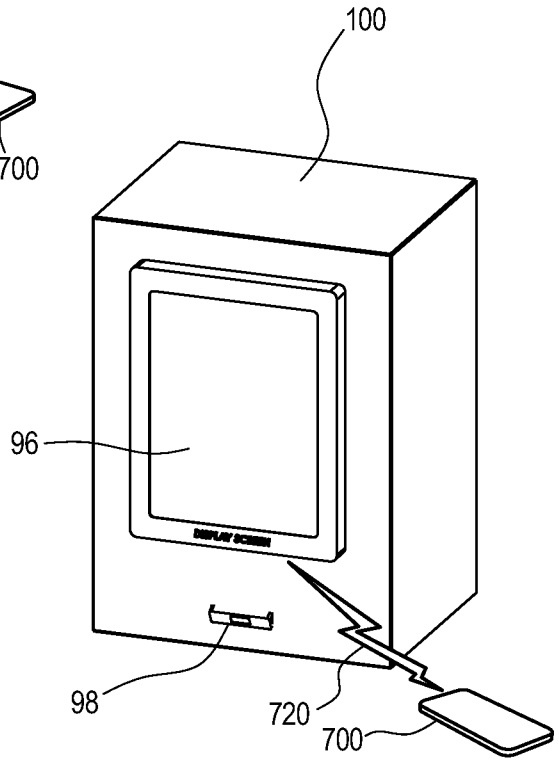


FIG. 19B

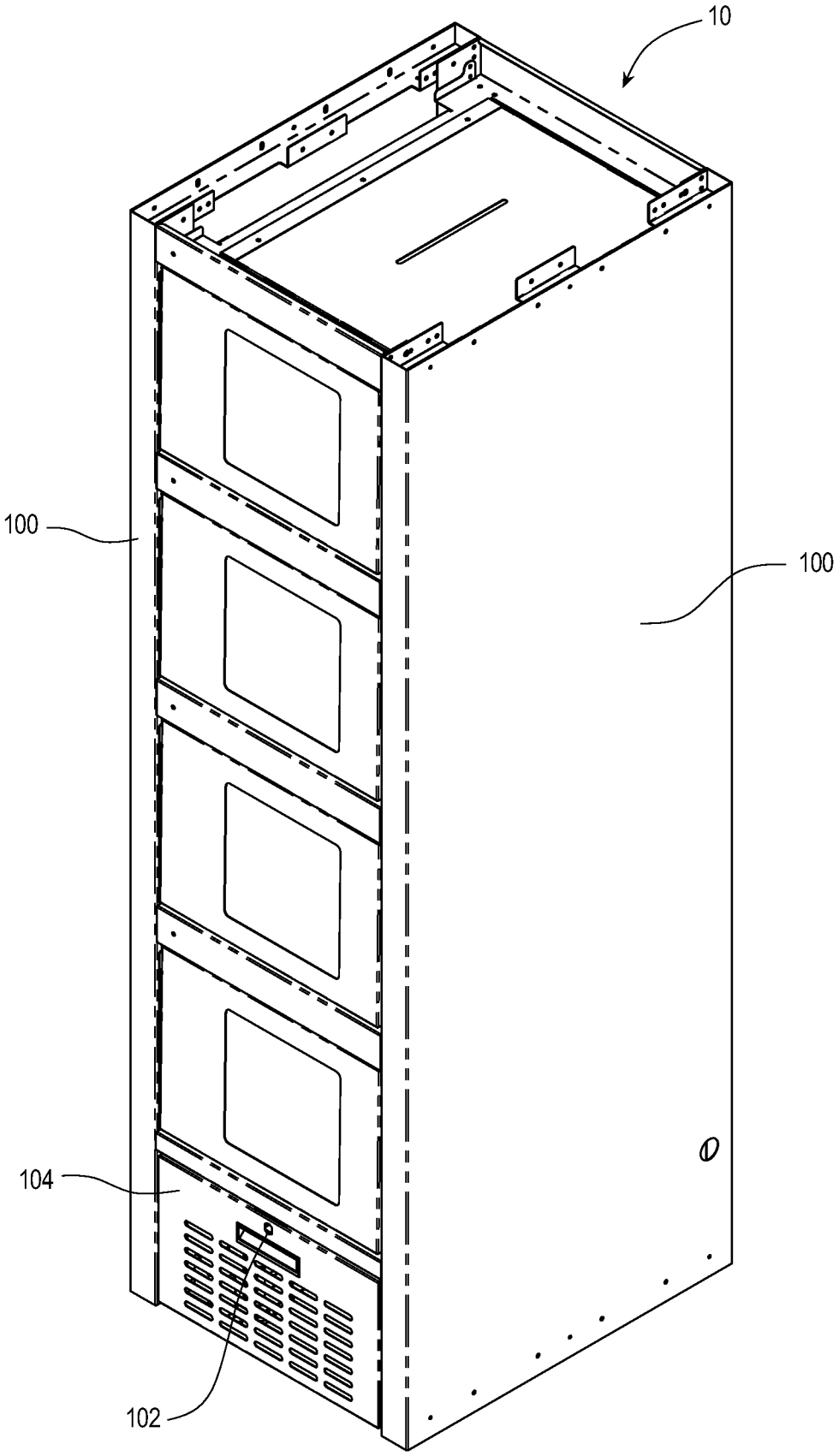


FIG. 20

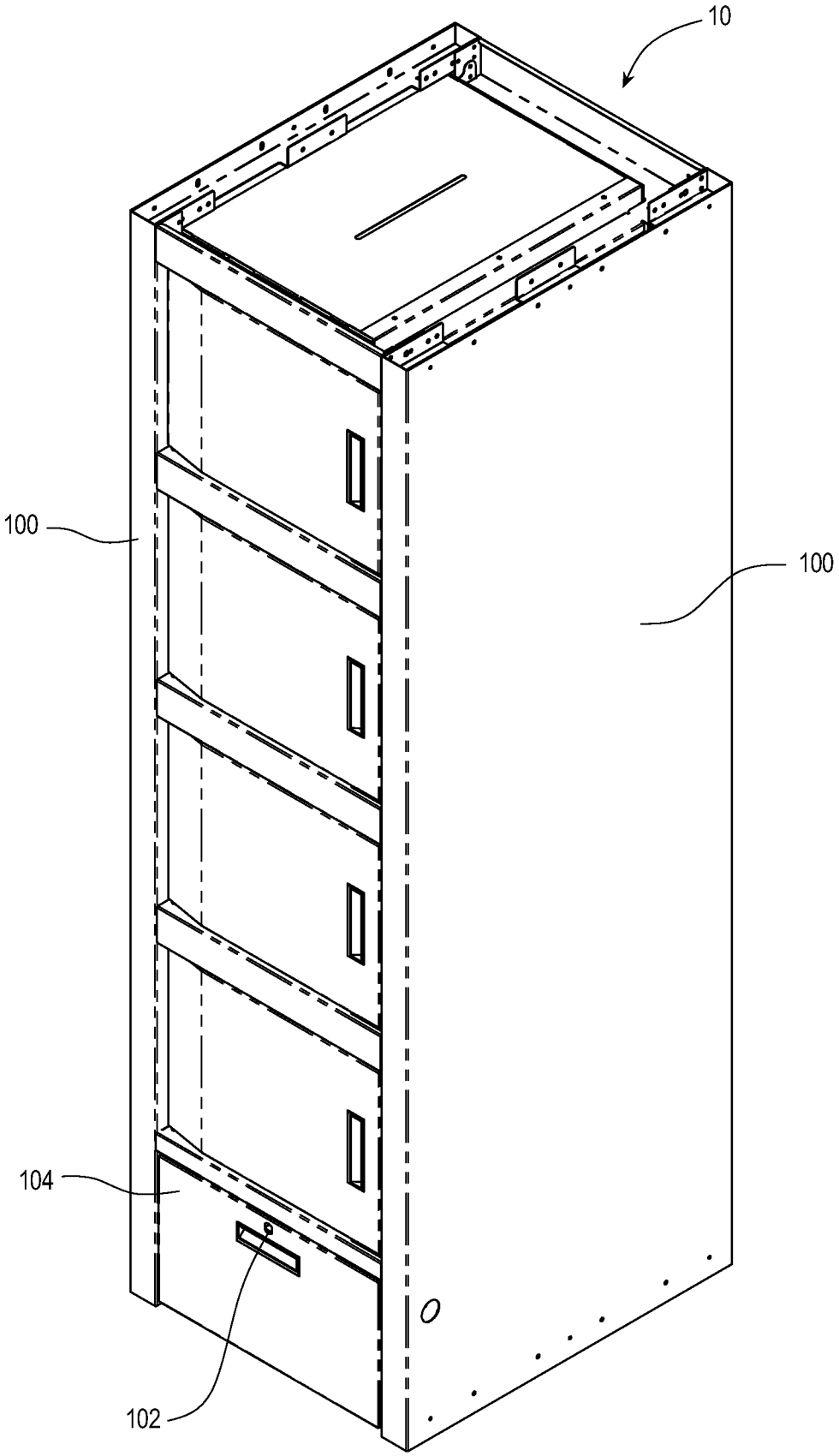


FIG. 21

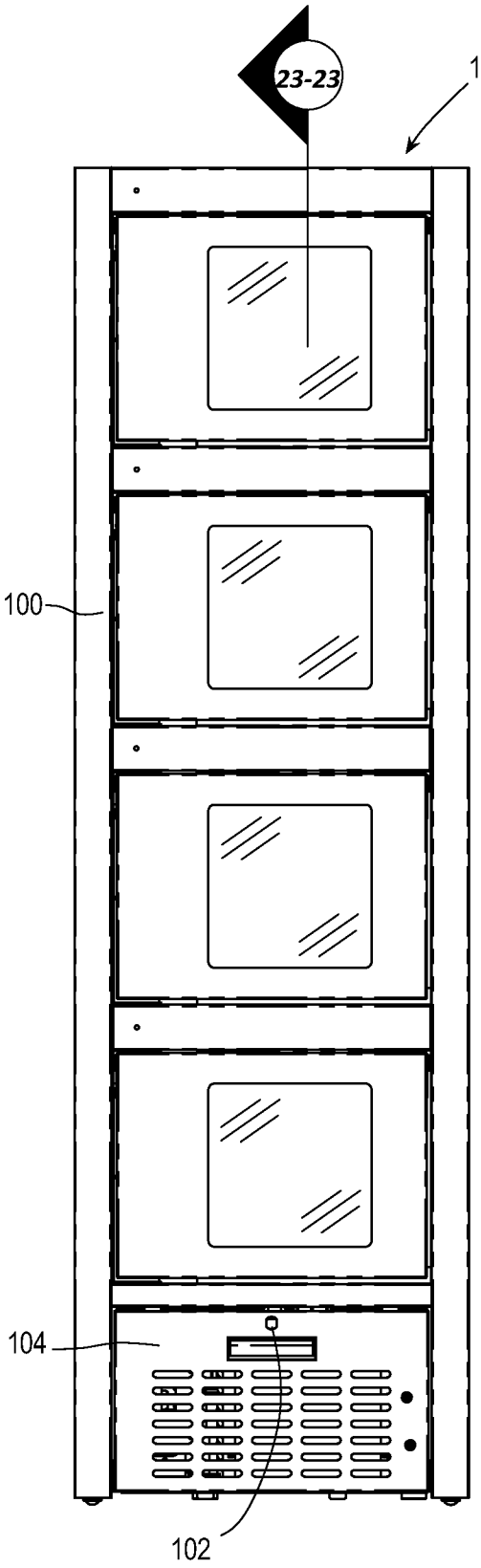


FIG. 22A

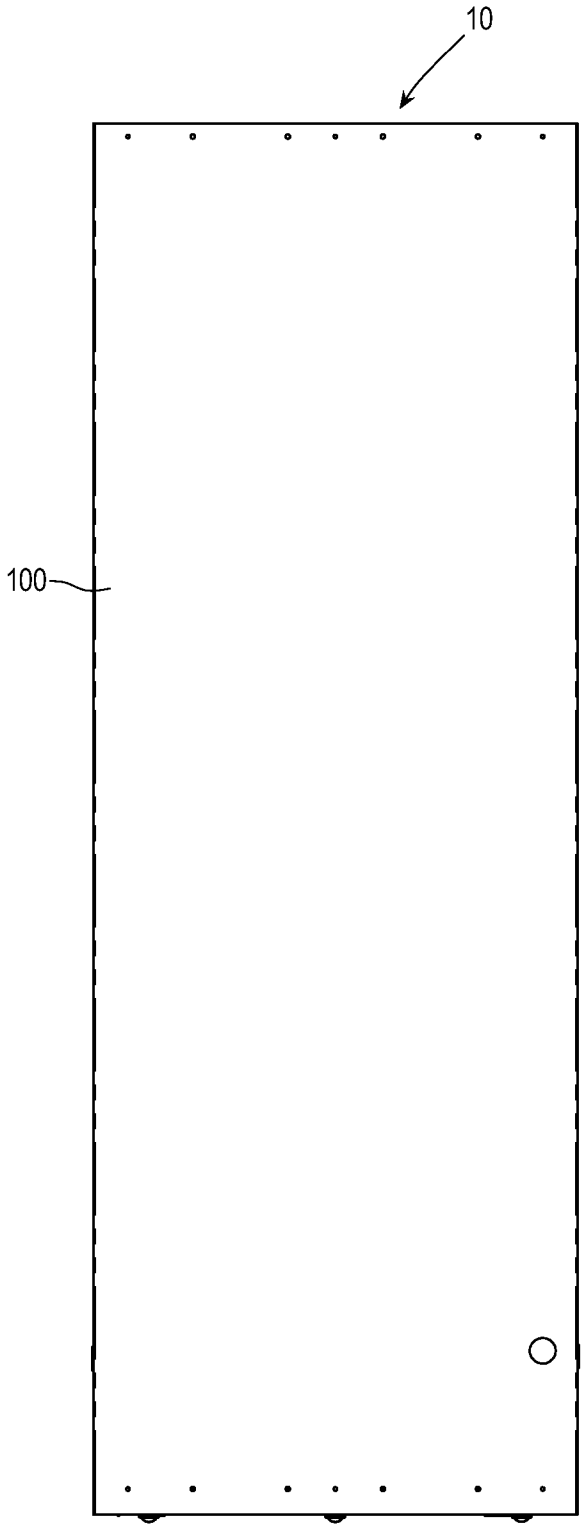


FIG. 22B

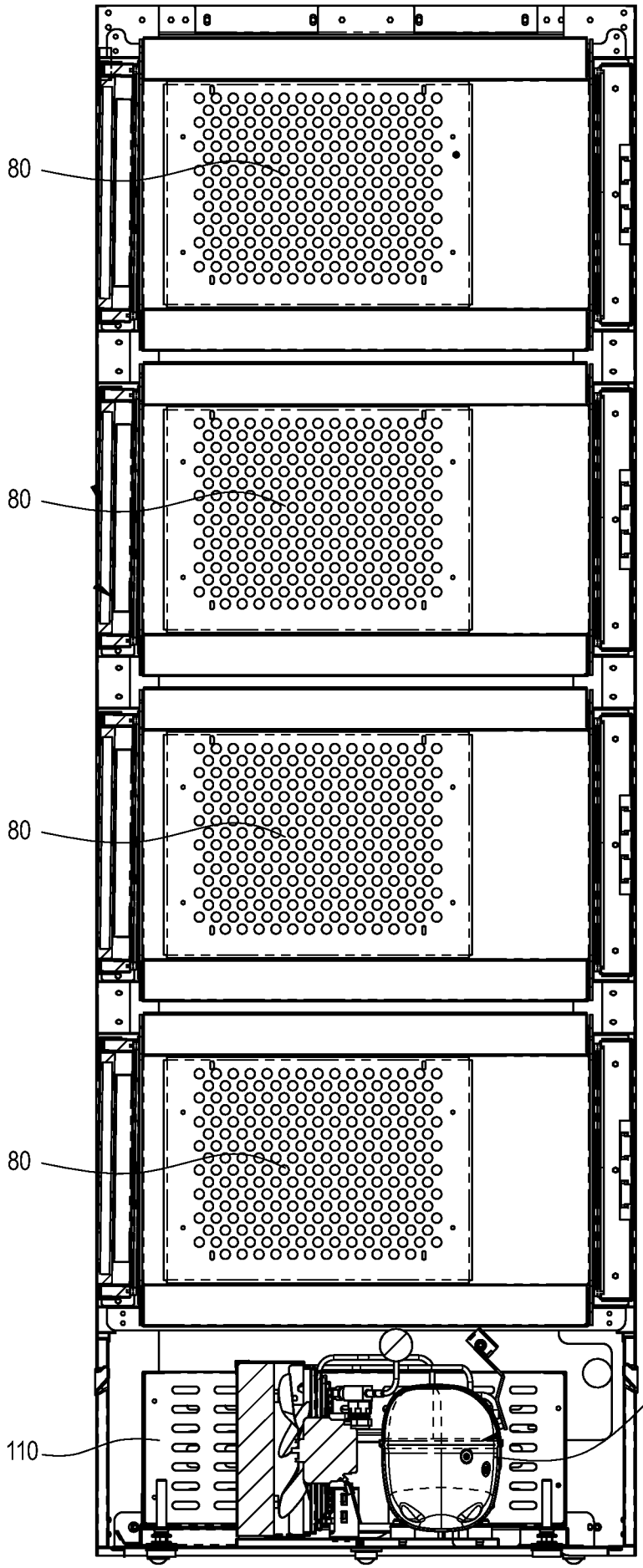


FIG. 23

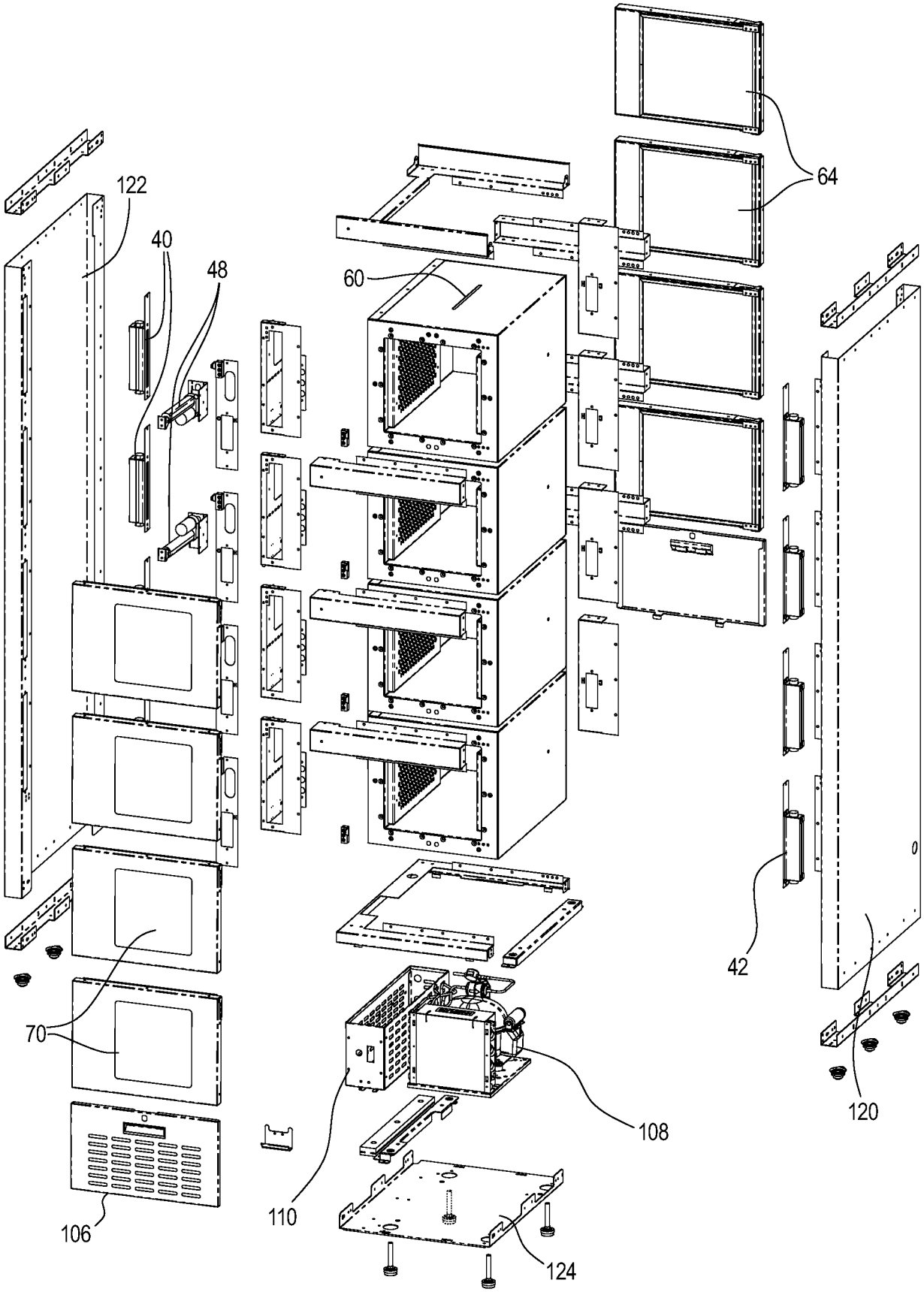
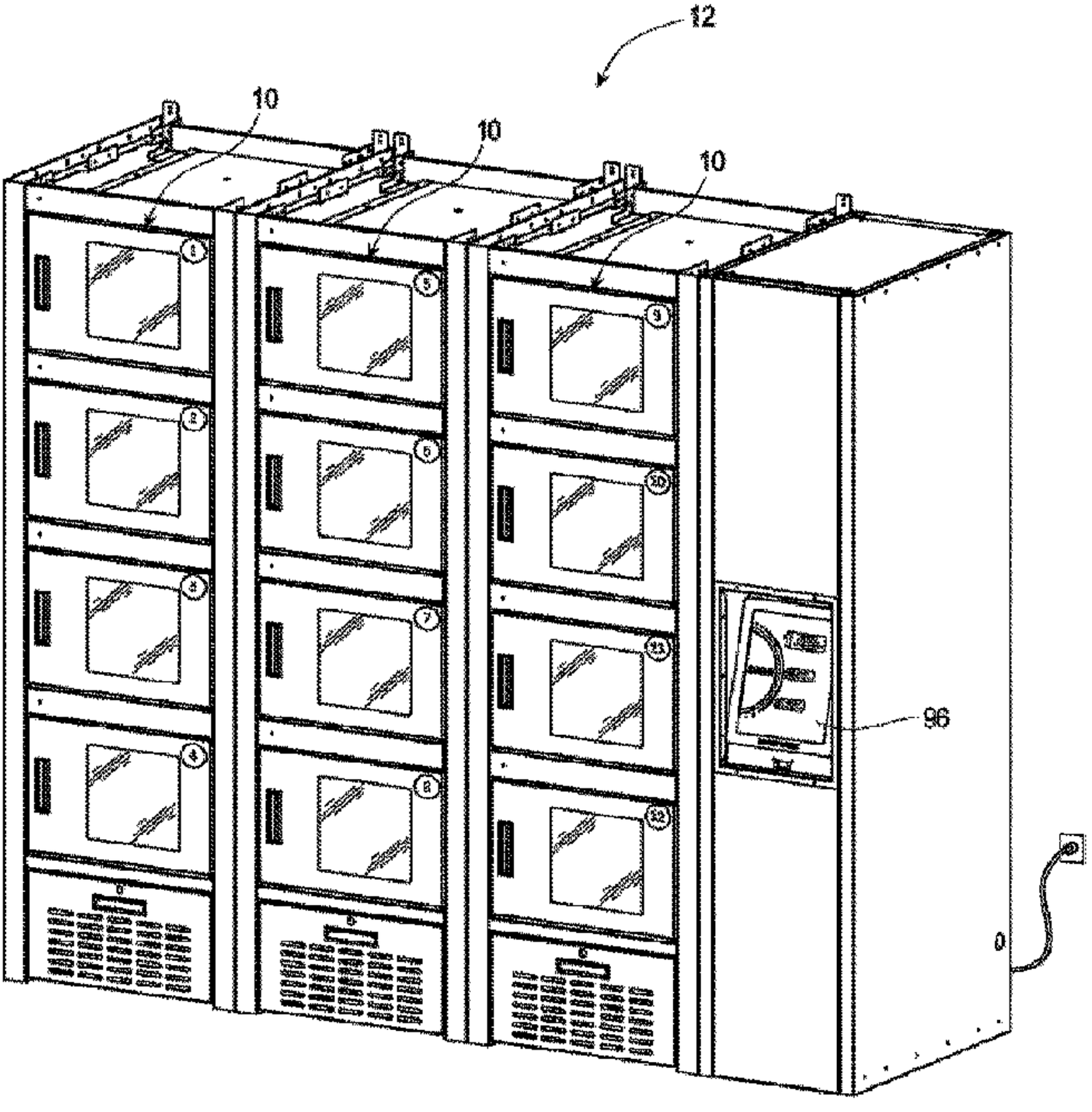


FIG. 24


12
10
10
10
96