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(54) Title: MEAL PACKAGING SYSTEM

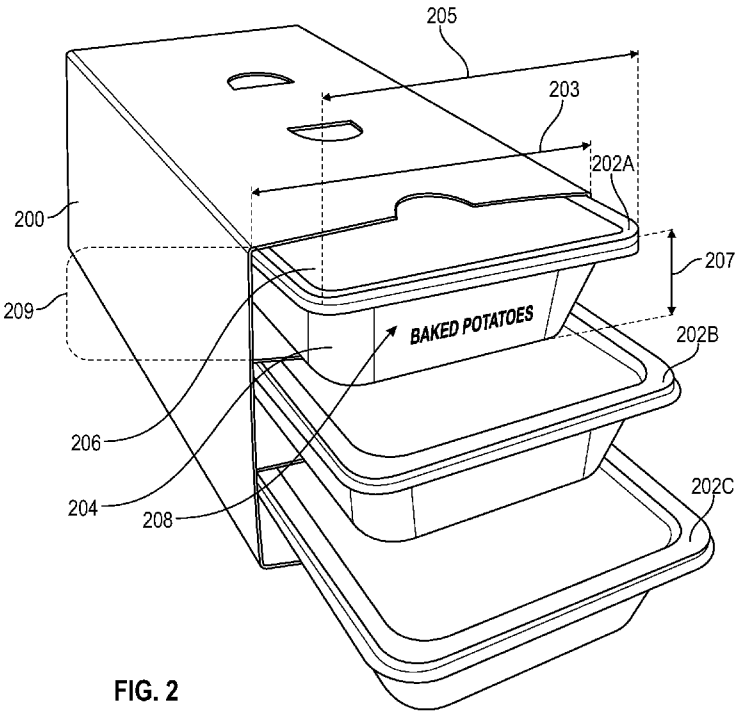

FIG. 2

(57) Abstract: A meal packaging system is disclosed. The meal packaging system includes a divided packaging that includes an outer shell defining an interior, and at least one divider disposed within the outer shell. The divider divides the interior into multiple container compartments having compartment dimensions. The meal packaging system also includes multiple food containers configured and dimensioned to fit within the container compartments. The meal packaging system further includes a computing device having a processor configured to execute instructions to cause the computer device to receive food selection data, generate a food selection scheme based on the food selection data, and output the food selection scheme. The food selection scheme includes instructions to place first and second of the food containers within first and second of the compartments.

[Continued on next page]

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TITLE: MEAL PACKAGING SYSTEM

CROSS-REFERENCE AND CLAIM OF PRIORITY

[0001] This patent document claims priority to U.S. Provisional Patent Application No. 63/349,941, filed June 7, 2022, the entirety of which is incorporated herein by reference.

BACKGROUND

[0002] This disclosure relates to the field of pre-packaged meals, such as those provided by meal delivery services. Many existing meal services deliver meals in inconvenient or large packaging. Additionally, when receiving a meal delivery that includes multiple meals, the current packaging structures and corresponding systems make is difficult for users to inventory all of the food items they have received or to customize meals after receiving the order.

[0003] This patent document describes systems, methods, and devices that address at least some of the issues described above and/or other issues.

SUMMARY

[0004] At least some of the problems associated with the existing solutions will be shown solved by the subject matter of the independent claims that are included in this document. Additional advantageous aspects are discussed in the dependent claims.

[0005] In various embodiments, a meal packaging system is disclosed. The meal packaging system includes a divided packaging that includes an outer shell defining an interior, and at least one divider disposed within the outer shell. The divider divides the interior into multiple container compartments having compartment dimensions. The meal packaging system also includes multiple food containers configured and dimensioned to fit within the container

compartments. The meal packaging system further includes a computing device having a processor configured to execute instructions to cause the computer device to receive food selection data, generate a food selection scheme based on the food selection data, and output the food selection scheme. The food selection scheme includes instructions to place first and second of the food containers within first and second of the compartments.

[0006] Implementations of the disclosure may include one or more of the following optional features. The meal packaging system may further include a user electronic device configured to receive food selections from a user and transmit the food selection data to the computing device. In some examples, outputting the food selection scheme includes displaying an indication of the first and second food containers. Outputting the food selection scheme may include displaying an indication of options or meal combinations based on the food selection data. The container sleeve may further include a second shelf that separates the carton interior into three vertically stacked compartments. In some examples, a first end of the container sleeve includes an opening, the first and second food containers include an identifier, and the identifier is readable through the opening. The opening may be a translucent portion of the first end. The opening may be a window through a portion of the first end. In some examples, the opening defines an access port for adding or removing food containers from the container sleeve. In some examples, the container sleeve further includes a door, the door covers the opening when the door is in a closed position, and the compartments are accessible when the door is in an open position. In some examples, the identifier is not readable when the door is in a closed position. In some examples, the identifier is readable when the door is in a closed position. The identifier may be machine-readable and may include one or more of the following: a bar code, a QR code, an electronic tag, or an RFID tag. At least one of the multiple food containers may be dimensioned to have an interference fit with the divided packaging. The divided packaging may include a sleeve having four sides defining an interior. The

compartments may be vertically stacked. In some examples, the food selection scheme includes an indication of a specific number of food containers based on a number of compartments of the divided packaging. The identifier may include an expiration date. The identifier may include a food type. In some examples, the container sleeve further includes a handle disposed on a first of the sides and the container sleeve further includes an opening on a second side that is perpendicular to the first side. The handle may be configured to be grasped from the top of the container sleeve. The handle may include one or more openings. The openings may be cutouts in the first side. In some examples, the food containers are sized relative to the container sleeve such that the container sleeve applies pressure to two opposite sides of the container. In some examples, a first end of the vertical sleeve carton is open and a second end of the vertical sleeve carton is closed. Outputting the food selection scheme may include sending instructions to a packaging device. The packaging device may include a container filler configured to fill the first and second food containers with corresponding food components. The packaging device may include multiple pre-filled food containers and may be configured to load the pre-filled food containers into the container sleeve. The first container may contain a first food component and the second food container may contain a second food component. The first food component may be different from the second food component. The first and second food components may together comprise a meal. The meal may be based on a volume of food. The meal may be based on a mass of food. The meal may be based on a food type of the first food component and second food component. The meal may be based on a cumulative nutritional value of the first and second food components.

[0007] In some alternate embodiments, a vertical meal container is disclosed. The vertical meal container includes a container sleeve defined by four sides, a first end, and a second end. The vertical meal container further includes a first shelf disposed on the interior of the sleeve and attached to a first side and a second side of the four sides. The vertical meal

container further includes a second shelf disposed on the interior of the carton parallel to the first shelf and attached to the first and second sides. The vertical meal container further includes multiple food containers including four upright walls, a bottom, and an openable top. A first food container is disposed between the first shelf and a third side of the sleeve. A second food container is disposed between the first and second shelves. And a third food container is disposed between the second shelf and a fourth side of the sleeve.

[0008] Implementations of the disclosure may include one or more of the following optional features. The meal container may further include a handle located on the fourth side of the sleeve. The handle may include one or more openings in the fourth side. The first shelf and second shelf may extend longitudinally from the first end to the second end.

[0009] In some alternate embodiments, a method for providing packaged meals is disclosed. The method includes receiving, by a processor, meal selection data. The method further includes determining, by the processor and based on the meal selection data, a meal including a first food component, a second food component, and a third food component. The method further includes filling a first container with an amount of the first component, filling a second container with an amount of the second component, and filling a third container with an amount of the third component. The method further includes obtaining a container sleeve having an outer wrap, an open end, and three compartments defined by a first shelf and a second shelf. The method further includes loading the first, second, and third containers into the compartments of the container sleeve.

[0010] Implementations of the disclosure may include one or more of the following optional features. In some examples, the meal selection data includes an indication of total meal calories, and the amounts of the first, second, and third components are based on the total meal calories. The meal selection data may include an indication of total meal mass, and the amounts of the first, second, and third components may be based on the total meal weight. The meal

selection data may include an indication of a cumulative nutritional value, and the amounts of the first, second, and third components may be based on the cumulative nutritional value. The meal selection data may include an indication of total meal volume, and the amounts of the first, second, and third components may be based on the cumulative nutritional value. In some examples, the method further includes determining a meal size based on the meal selection data, wherein obtaining the container sleeve is based on the meal size, and wherein the first, second, and third containers have a size corresponding to the container sleeve size. The method may further include sealing the filled first, second, and third containers. In some examples, the first, second, and third containers are loaded into the compartments of the container sleeve in an orientation in which the open end exposes at least a portion of the first, second, and third containers, and the exposed portions of the first, second, and third containers display an identifier. The method may further include scanning the identifier and updating, based on the scanning, an inventory of food components that is associated with an individual.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a diagram depicting an example meal packaging system.

[0012] FIG. 2 is a perspective view of an embodiment of a container sleeve with food containers packaged therein as used in the system of Fig. 1.

[0013] FIG. 3 is a perspective view of a food container of Fig. 2.

[0014] FIG. 4 is a front view of the container sleeve of FIG. 2 without food containers.

[0015] FIG. 5 is a top view of the container sleeve of FIG. 4.

[0016] FIG. 6 is a closed back view of the container sleeve of FIG. 4.

[0017] FIG. 7 is an open back view of the container sleeve of FIG. 4.

[0018] FIG. 8 is a plan view of an example unfolded blank of a container sleeve.

[0019] FIG. 9 is a top view of another embodiment of a packaging unit for food containers such as shown in FIG. 3.

[0020] FIG. 10 is a front view of the example tray packaging of FIG. 9.

[0021] FIG. 11 is a flow chart of an example method for providing a packaged meal.

[0022] FIG. 12 illustrates an example user interface of a meal packaging system.

[0023] FIG. 13 illustrates an example user interface of a meal packaging system.

[0024] FIG. 14 illustrates an example user interface of a meal packaging system.

[0025] FIG. 15 illustrates an example user interface of a meal packaging system.

[0026] FIG. 16 illustrates an example user interface of a meal packaging system.

[0027] FIG. 17 illustrates an example user interface of a meal packaging system.

[0028] FIG. 18 illustrates an example user interface of a meal packaging system.

[0029] FIG. 19 illustrates an example user interface of a meal packaging system.

[0030] FIG. 20 illustrates an example user interface of a meal packaging system.

DETAILED DESCRIPTION

[0031] Terminology that is relevant to this disclosure includes:

[0032] An "electronic device" or a "computing device" refers to a device that includes a processor and memory. Each device may have its own processor and/or memory, or the processor and/or memory may be shared with other devices as in a virtual machine or container arrangement. The memory will contain or receive programming instructions that, when executed by the processor, cause the electronic device to perform one or more operations according to the programming instructions. Examples of electronic devices include personal computers, servers, mainframes, virtual machines, containers, gaming systems, televisions, and mobile electronic devices such as smartphones, personal digital assistants, cameras, tablet computers, laptop computers, media players and the like. In a client-server arrangement, the

client device and the server are electronic devices, in which the server implements instructions and/or data to provide a service that the client device accesses via one or more communications links in one or more communications networks. In a virtual machine arrangement, a server may be an electronic device, and each virtual machine or container may also be considered to be an electronic device. In the discussion below, a client device, server device, virtual machine or container may be referred to simply as a "device" for brevity.

[0033] In this document, the singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise. In this document, the term "comprising" means "including, but not limited to." Unless defined otherwise, all technical and scientific terms used in this document have the same meanings as commonly understood by one of ordinary skill in the art.

[0034] FIG. 1 illustrates various elements of a meal packaging system **100**. The system includes a meal configuration server **102** that is includes or is communicatively connected to a data store **104** of meal and user information, such as food components, meal combinations, user profiles and preferences, packaging configurations, etc. The server **102** communicates with any number of client electronic user devices **106** via one or more communications networks **108**. The meal configuration server **102** provides a website and/or data for one or more client-installed meal configuration applications that the client electronic devices **106** can access via one or more locally installed applications, such as a web browser, dedicated mobile application, or other type of software application. A user of a client electronic device **106** may view, select, customize, and order meals using interface provided by server **102** or via the application installed on the user's client electronic device **106**. In various embodiments, the meal configuration server **102** also may communicate with a packaging computing device **110** via the communications network(s) **108**. In other embodiments, the meal configuration server

102 may itself also include programming and perform functions of the packaging computing device **110** that will be described below.

[0035] Packaging computing device **110** is connected to at least one of a display **112** or a packaging device **114**. Packaging computing device **110** and packaging device **114** can be connected directly (e.g., a wired or other device to device direct communication) or can communicate through network **108**. Optionally, packaging computing device **110** can be onsite at a warehouse or other facility, and may be remote from meal configuration server **102**. In some embodiments, packaging computing device may be remote from display **112** or packaging device **114**, which instead may be onsite at a warehouse or other facility. Packaging device **114** can be a robotic picker, robotic packaging machine, or similar robotic machine that can package meals. Functions of packaging device **114** will be described in more detail below.

[0036] The meal configuration server **102** executes programming instructions of a meal configuration engine that causes the locally installed application of the client device **106** to output a web page or other user interface by which a user may view, select, and/or order products from the meal distributor who is associated with the server **102**. Alternatively, the meal configuration server **102** may provide instructions and/or data to the locally installed application to enable the client device **106** to operate as the meal configuration engine and output the user interface. The webpage or user interface may include a script, authentication mechanism, or other technical feature that calls or points to an address of the meal configuration server **102** so that the meal configuration server **102** serves the meal configuration application, data, and/or instructions to the client device **106** via a window or pop-up within the webpage or product configuration application. An example of this is illustrated in FIG. 12, in which the user interface of a meal configuration engine **500** is a web page, as displayed by a browser application, with a drop-down or otherwise functional menu via which the user may access functions of the meal configuration engine.

[0037] The meal configuration engine **500** may initially output a number of questions or user-selectable options for which the user can respond. By way of example in FIG. 12, the system provides a list of pre-configured meals that a user can choose from. As described below, the user may select one or more of these meals, which the user interface may enable the user to customize by changing one or more of the food components (i.e., protein, vegetable, and/or starch) within the meal. As another example, shown in FIG. 13, the meal configuration engine **500** can provide user-selectable options for individual meal components to create a meal. Thus, the system may enable the user to select meals or components without necessarily answering a number of questions or filtering through a variety of selectable options. Instead, the system may present the user with meals or food components and provide an interface via which the user is given the option of making individual selections.

[0038] The meal configuration server may also provide a set of questions. As an example, the questions may relate to a user's food preferences, allergies, sensitives, specific diet plans the user adheres to, medical conditions, or other dietary restrictions or requests. In some embodiments, the meal configuration server may provide a set of questions in a tree-based rule set (or another structured rule set) to provide the shortest path to a specific meal selection. The questions may result in a selection of a specific meal recommendation, or a subset of meals or meal components.

[0039] Example: a first scenario may require ten user interactions to get to the optimal recommendation, while a second scenario (with different user responses to the initial questions) may allow the user to get to the meal selection in three steps. As another example, if a user's profile includes a specific medical condition or taste preference (such as a gluten allergy or an aversion to mushrooms), then the meal configuration engine may exclude any meal components that conflict with that condition (i.e., by presenting that user options that only

include meal components that are gluten-free or mushroom-free and not offering that user any meal components that contain gluten or mushrooms).

[0040] The meal configuration server can, based on the user's answers to the questions, generate a score for meal components or pre-packaged meals. The score can provide an indication of the meal's compatibility with the user. A score may be a numerical score or other quantitative score, a relative level, or a pre-defined scale or rating indicating a meal or food component's suitability for a particular person. For example, a score may be a number within a 1-10 scale, where the higher the number, the more suitable the meal. As another example, a meal may be assigned one of three different levels or ratings such as "not suitable," "moderately suitable," or "ideal." The score can be based on one or more of the user's answers. For example, if a user indicates that she is allergic to dairy products, the server can give a score of "1" or "not suitable" to all meals or food components containing milk, cheese, or other dairy products. As another example, if a user's answers indicate that they require a high protein diet, the meals with greater than 30 grams of protein can receive high scores (e.g., over an 8 or a "moderately suitable" or "ideal"). The system may determine which meals or food components exceed a threshold score value and then present those to the user in the interface. Additionally, or alternatively, the system may identify the highest scored meals or components and generate custom meals or a custom meal plan based on the scores.

[0041] The selections of meals or meal components by the system can result in meal selection data (in the form of the selections) being sent from the user client device **106** to the meal configuration server **102**. The meal selection data may include pre-configured meal selections, individual component selections, diet selections, dietary restrictions information, medical diagnosis information, food sensitivities, calorie goals, food volume restrictions, macronutrient requirements, micronutrient requirements, and/or other information indicating a user's food preferences. The food selection data may come in the form of user selected options

for meals or food components (e.g., as shown in FIGs. 12-19) or a survey (e.g., as shown by FIG. 20). Upon receiving the meal selection data, the configuration server **102** can generate a food selection scheme based on the meal selection data. The food selection scheme is data indicating the meals to be packaged and sent to the user. For example, the food selection scheme can indicate the specific pre-configured meals that the user selected, as well as a quantity for each meal. Similarly, the food selection scheme can indicate the specific food components a user has selected. Configuration server **102** may analyze the components and place them into meals (e.g., for packaging together in a container sleeve). The food selection scheme can further include instructions for a packaging system to place one or more containers of food or a plurality of containers into a container sleeve. For example, the food selection scheme can also include instructions to place first and second food containers within first and second compartments of a container sleeve. The food selection scheme can also include packaging information such a size of the containers in which to package the food, as well as a size or configuration of a container sleeve in which to place the containers. For example, the food selection scheme can include an indication of a specific number of food containers based on a number of compartments of the divided packaging. In other words, the number or containers can be selected based on the number compartments in a container sleeve, or vice-versa.

[0042] As used herein, a food component (or meal component) is a portion of food that makes up a larger meal. For example, a food component could be a meat, such as chicken. As another example, a food component could be a vegetable, such as green beans. As a third example, a food component could be a starch, such as a potato or rice. A meal is a combination of two or more food components. Additionally, or alternatively, a meal can be defined by a certain volume of food, a certain amount of mass of food, a certain combination of food types (e.g., a protein, a starch, and a vegetable), or a certain cumulative nutritional value. A

cumulative nutritional value can be based on a desired amount of macronutrients (fat/carbs/protein) or micronutrients (vitamins, minerals, etc.). As an example, a meal could be created to have a total of 50 grams of protein or at least 100 mg of magnesium. As another meal example, a meal could be the equivalent of three containers **202** of food. As another example, a meal could be 60 cubic inches of volume of food.

[0043] Upon determining the food selection scheme, packaging computing device **110** can output the food selection scheme to a display **112** or packaging device **114**. Outputting the food selection scheme to the display **112** can include sending instructions to display an indication of specific food containers to be placed in a container sleeve. For example, outputting the food selection scheme can include displaying an indication of the first and second food containers that are to be loaded into a container sleeve. This display, for example, can be placed in a packaging department and a human packer could view the display and place the corresponding containers into a container sleeve for shipping to the consumer.

[0044] In another embodiment, the food section scheme can be output to a packaging device **114**. Packaging device **114** is an automated machine that picks food containers and loads food containers into a container sleeve. In some embodiments, packaging device can include a refrigerated portion in which pre-filled food containers are stored. In other embodiments, packaging device **114** is loaded with various food components and stock of containers. Packaging device **114** can include a container filler configured to fill the containers with the desired food component (based on the food selection scheme), seal the containers, and place the containers into a container sleeve.

[0045] The food components loaded into containers and placed into a container sleeve can be different from each other or the same. Together, the combination of one or more components can form a meal, as described above. In other embodiments, an entire meal may

be packaged into a single container. Thus, multiple containers each having a meal within them could be loaded into a container sleeve.

[0046] Thus, system **100** can be used to fill and pack food containers for distribution to customers. Accordingly, the system can further include a plurality of food containers and one or more packaging elements, such as divided packaging elements. FIG. 2 illustrates a perspective view of an embodiment of a divided packaging element, which is provided as a container sleeve **200** configured to pack food containers **202A-C**, for example such that they can be slid in and out of the sleeve. In this embodiment, the container sleeve **200** is arranged to receive the food containers **202A-C** in a vertical stack within it. Food containers **202A-C** have a bottom portion **204** and a top **206**. Food containers **202A-C** also include an identifier **208**, which is placed on an outside surface of the bottom portion **204**, top **206**, or both. Identifier **208** can be a written indication of information related to the contents of the food container **202**. For example, identifier **208** can be a name or type of the food within the food container, nutritional information, an expiration date associated with the food, and/or other desired information. As an example, a type of food may include a category of such as meat or protein, starch, or vegetable. The food type may also include a name of the food such as salmon, chicken, white rice, or corn. In some embodiments, the identifier is machine-readable. A machine-readable identifier can include a linear bar code, a two-dimensional code such as a QR code, a data matrix code, or other machine-readable code. A machine-readable identifier can also include an electronic tag, such as an RFID tag, a Bluetooth or Bluetooth Low Energy (BLE) tag.

[0047] Containers **202A-C** of this embodiment are configured and dimensioned to form a close fit within container sleeve **200**, so that the container sleeve **200** retains the containers **202A-C** within container sleeve **200** against falling out. In other words, the containers **202A-C** can be sized relative to the sleeve **200** such that the sleeve **200** applies pressure to two

opposite sides of the containers **202A-C** (e.g., either the top and bottom, left and right sides, or both). As one example, containers **202A-C** have a width **205** that can be slightly larger than the width **203** of the container sleeve. Additionally, or alternatively, the height **207** of the containers **202A-C** can be slightly larger than the height **209** of a compartment of the sleeve **200**. Thus, the containers **202A-C** can be dimensioned to have an interference fit with the divided packaging. In other embodiments, sleeve **200** or containers **202A-C** can include a retention feature such as a small protrusion. For example, containers **202A-C** could include a small protrusion on an outside surface positioned to contact an inner wall of sleeve **200**. Additionally, or alternatively, sleeve **200** could have a protrusion on an inside surface that is positioned to contact one or more of the containers **202A-C** when the containers are placed in or removed from sleeve **200**. In other embodiments, the container sleeve **200** can include a retention mechanism, such as a protrusion that interacts with or blocks the food containers **202A-C** from falling out.

[0048] Referring to FIG. 3, bottom portion **204** of container **202** includes a bottom **210**, and four substantially vertical walls **212A-D**. The bottom **210** and walls **212 A-D** define a cavity **214** into which a food component can be placed. The walls **212A-D** can form a lip **211** at their top that extends around the perimeter of the container **202**. The container **202** can be molded as one piece from a food grade plastic material or similar material, such as but not limited to crystallized polyethylene terephthalate (CPET). The material, like CPET, can be refrigerator, freezer, and shelf stable. The top **206** is a film **216** and is openable. The film **216** can be made a peelable food grade material such as high barrier EPC-60 or similar materials. The film can be peelable when sealed to container **202**. In other embodiments, the top may be a lid, removeable cover, or other element that closes and/or seals the container and is openable to access the contents of the container **202**.

[0049] To seal the food component within container **202**, film **216** is heat sealed to the top portions of walls **212A-D**. The heat seal can optionally take place as part of a modified atmospheric processing ("MAP") process. During the MAP process, the air within the container **202** can be modified by decreasing the oxygen level to less than one percent and replacing the removed oxygen with a combination of nitrogen and carbon dioxide. The low oxygen levels present within the sealed container **202** can aid in food preservation, thus increasing the shelf life of the food component within sealed container **202**. In some embodiments, the selection of material for **216** can be specific to be compatible with the MAP process. Other suitable constructions of the food containers can be used in other embodiments. Other suitable sealing processes can be used.

[0050] Food components can be pre-prepared and pre-cooked. In other embodiments, food components may be prepared (i.e., various ingredients mixed together or placed into a container) but not cooked. While container **202** is described as containing a food component that serves as a part of a larger meal, in some embodiments, a single container **202** may contain a meal.

[0051] FIG. 4 illustrates a container sleeve **200**. Container sleeve **200** has an outer shell forming an interior. The outer shell can be made of four sides forming a sleeve: a top **220**, a bottom **222**, a left side **224**, and a right side **226**. Between top **220** and bottom **222** are two dividers **228**, **230** that are each attached to left side **224** and right side **226** and form three compartments **232**, **234**, **236**. The dividers **228**, **230** extend longitudinally along sleeve **200** from the open end **201** (also referred to herein as opening **201**) to closed end **238**. As described below, either end of dividers **228**, **230** may be spaced from the ends of sleeve **200** by a gap **243**. The end of each compartment **232**, **234**, **236** forms an opening. Dividers **228**, **230** can form shelves that support a container **202** (e.g., as depicted in FIG. 2). The shelves are parallel to each other and to top **220** and bottom **222**. Top **220** and dividers **228**, **230** can include notches

231. Notches **231** can be semi-circular as depicted or take other shapes such as triangles or rectangles. Notches **231** can provide enhance a user's ability to grab a portion of food container **202** when disposed within container sleeve **200**.

[0052] In other embodiments, dividers **228**, **230** can be a container support. For example, the container supports can include protrusions from opposite sides, for instance the left side **224** and right side **226**, that are dimensioned to support at least a portion of food containers **202,** such as to support the lip **211** of containers **202**. For example, a container support can be a ridge extending partially into the interior of container sleeve **200**. Such a container support can be configured to not extend completely across the interior of container sleeve **200**, leaving a gap between the protrusions coming from left side **224** and right side **226**. This gap may permit food containers of different thicknesses to be held in container sleeve **200**.

[0053] Food containers **202** can be disposed in compartment **232** between divider **228** and top **220**, in compartment **234** between divider **228** and divider **230**, and compartment **236** between divider **230** and bottom **222**. While container sleeve **200** is depicted as having two dividers **228**, **230**, more or fewer dividers are possible. Further, in some embodiments, container sleeve **200** can have multiple rows of dividers forming compartments, with a vertical divider in between running from top **220** to bottom **222**. Thus, as an example, container sleeve **200** could have six compartments (two vertical columns of three compartments, the vertical columns separated by the vertical divider). In other embodiments, the dividers can be arranged to arrange the compartments in a horizontal row, thereby producing a wide, flat sleeve.

[0054] The top **220** and bottom **222** of containers **202** form relatively large surface areas compared to the sides **224**, **226**. The orientation of containers **202** relative to their tops **220** and bottoms **222** can determine the verticality of the containers **202**. Where the divided packaging arranges the food containers vertically, the larger surface areas of the food containers are stacked on each other. In other words, in a vertical orientation, the top **220** of

one container will be oriented below the bottom **222** of a second container. This will form an arrangement such that the bottom **222** of one container will face the top **220** of another container. Conversely, where food containers are arranged horizontally, narrower surface areas (e.g., the sides), other than the largest, of each food container are oriented next to each other. Here, the sides of the containers can face each other and the tops and bottoms of each container will be approximately coplanar. In other embodiments, where the packaging element is a tray, the container can be oriented vertically, but placed horizontally next to each other on top of the tray (e.g., as described below and illustrated in FIGs. 9 and 10).

[0055] FIG. 5 illustrates a top view of container sleeve **200**. Container sleeve **200** includes a handle **239**. The handle **239** can be disposed on top **220**, making the handle configured to be grasped from the top of the container sleeve **200** and keep the container sleeve in an upright orientation. The handle can be a separate handle attached to top **220**. In other embodiments, as depicted in the figures, the handle can include one or more openings **240A**, **240B**. The handle openings can be cutouts. Because the handle is located on top **220**, it is located perpendicular to the opening **201** for compartments **232**, **234**, **236**. The handle **239** is typically disposed on a side of the packaging, or otherwise configured to be held from a side of the packaging, located over one of the large surface-area sides of the food containers, which typically corresponds to the top side of the food containers, although in other embodiments, the handle can be placed on other sides of the packaging.

[0056] Sleeve **200** has an open end **201** and a closed end **238**. The open end **201** provides an access port to compartments **232**, **234**, **236** for adding or removing containers **202A-C**. Containers **202A-C**, as shown in FIG. 2 can be positioned such that identifier **208** is visible through the opening formed by the open end. In some embodiments, a human-readable identifier is visible through an opening, while another machine sensed identifier can be positioned hidden within the packaging. The closed end of sleeve **200** is illustrated by FIGs. 6

and 7. The closed end can include a door **235**. The door **235** can be in a closed positioned (FIG. 6) or an open position (FIG. 7) that provides access to the compartments **232**, **234**, **236**. Door **235** can include a flap **242** that can be tucked inside the sleeve **200** in the closed position. A gap **243** can be present between the end of sleeve **200** and the dividers **228**, **230** to provide clearance for the flap **242**. The closed end of sleeve **200** can also include top flap **244** and bottom flap **246** to provide extra security to the closed end.

[0057] In other embodiments, both ends or neither ends of sleeve **200** may be closed. If both ends are closed, both ends may have a door **235** to permit access to containers placed inside the sleeve. Door **235** may include one more openings (not pictured). The openings can be a translucent portion of door **235** or a window through a portion of door **235**. Identifier **208** of containers **202A-C** can be visible through the open end and/or openings in door **235**. For example, the translucent portions or windows of door **235** can be positioned to expose identifier **208** when door **235** is in a closed position. In embodiments without openings in the door **235**, the identifier **208** is not visible when the door is in the closed position.

[0058] Sleeve **200** can be made from a cardboard, laminated cardboard, coated cardboard, paperboard, foldable plastic, or other suitable material. Sleeve **200** can be formed from a single material blank, illustrated by FIG. 8, and folded and secured to form sleeve **200**. In some embodiments, an adhesive holds the assembled sleeve together, and in some embodiments, tabs or other known interlocking or otherwise folding features hold the sleeve together. In the embodiment shows, strip **248** is affixed to the left side **224**, and strips **250**, **252** are affixed to the ridge side **226** to form a right angle (when the food containers are loaded therein) between the sides **224**, **226** and dividers **228**, **230**. Adhesive used to attach strips **248**, **250**, **252** can be a glue, tape, or other suitable adhesive material and may be specific depending on the material used to construct sleeve **200**. In some embodiments, sleeve **200** may be formed

by a machine that cuts or stamps the blanks, folds the blanks, and applies adhesive to strips **248**, **250**, **252** to form the sleeve **200**.

[0059] FIGs. 9 and 10 illustrates another embodiment of a packaging element employing a tray **300**. Other embodiments can include other suitable types of packaging elements. Tray **300** can be made of a cardboard or recyclable paper material, such as sugarcane. Tray **300** can have four substantially vertical walls **314** and a bottom **312** together forming a cavity in which containers **302A-C** are received. The dimensions of tray **300** can be configured such that tray **300** receives a certain number of containers **302** (e.g., 2, 3, 6, or another number). Containers **302** can be substantially as described above with respect to containers **202**. Tray **300** has a depth **308** that is less that than the depth of containers **302**. This depth difference is illustrated by distance **310** of containers above tray rim **316**. Width **306** of tray **300** can be sized to receive a certain number of containers **302** based on width **304** of containers **302**. By way of example in FIG. 10, width **306** can be larger than three times width **304** so that tray **300** can receive three containers **302**. In some embodiments, an outer wrap **317** is placed around tray **300** and containers **302A-C**. The outer wrap **317** can be a securing film, such as a shrink wrap that is placed completely around the tray **300** and containers **302A-C** to hold containers **302A-C** in tray **300**. In other embodiments, the outer wrap **317** can be a band or cord that wraps around tray **300**, but only covers a portion of the outer surface. The band or cord can also secure containers **302A-C** to tray **300** to prevent them from falling out of tray **300**.

[0060] FIG. 11 illustrates a process by which the meal configuration engine may operate. A user interface of an electronic device displays a user interface (step **402**) that provides a user with options for selecting a meal or components. The user interface may be served by a meal configuration engine, as described above in the context of FIG. 1. The meal configuration engine may include or have access to a data store **104** of data related to various food components and meals. The meal configuration engine can access the data store **104** and

retrieve data (step **404**) related to pre-configured meals (e.g., FIG. 12) and/or food components (FIG. 13). The meal configuration engine can then take the retrieved data and display meal options in the interface (step **406**). An example of such a user interface is shown in FIG. 12, in which the user interface **500** displays a plurality of pre-configured meals **502**, **504**, **506** (and others) that a user may choose by clicking on a corresponding selection button **510** for each meal. Each pre-configured meal includes a combination of meal components that the system has identified based on one or more rules, such as a product availability, user preference, total calorie limitations, and the like. In some embodiments, the user interface **500** can provide a selection of multiple pre-configured meals as part of a bundle. The bundle may, for example, be based on a specific type of diet or nutritional plan or philosophy such a ketogenic diet, a Mediterranean diet, or a diabetic friendly diet. Selection indication **508** can show information related to the user's selection of a meal. The pre-configured meals displayed can also be generated based on the results of a user-answered questionnaire, such as the example provided in FIG. 20. Additionally, the meal configuration engine can populate one or more fields of the user interface with images of meals or food components.

[0061] Customization button **512** can provide the user with options to customize a pre-configured meal, for example, by exchanging one or more of the food components within the meal with another food component. When a user makes a selection in user interface **500** (e.g., by clicking selection button **510**), meal selection data regarding the selection can be sent by the client device and received by the meal configuration engine (step **408**). In some embodiments, one or more of the user interfaces of FIGs. 12-19 can be part of a subscription meal service. Accordingly, for example, a customization button **512** may be provided in other interfaces that permit a user to customize previously selected meals as part of a subscription service.

[0062] Another example of such a user interface is shown in FIGs. 13-17, in which individual food components can be selected by the user. The user interface **500** can provides a

plurality of food component selections **514**, **516**, **518** (and others) that a user may choose by clicking on selection button **520**. The user's selection can appear in selection indication **522** of sector **524**, which can indicate to the user which food components the user has selected for the current meal. For example, as shown by FIG. 14, area **526** can indicate that the user selected Cod for the first food component. A food data field **528** can be updated when a selection is made by retrieving the data for the selected meal and its components from the data store. Food data field **528** can display nutritional facts about the particular selection, or the combination of food components making up the selected meal. FIGs. 15 and 16 similarly show the further selection and updating of interface **500** with the user's selection of Green Beans and Baked Potato as meal components for the selected meal. In some embodiments, the food data field **528** can include an image that is dynamically updated based on the user's selections. For example, when the user selects Green Beans and Baked Potato, the image may be updated to depict Green Beans and a Baked Potato. Such update can occur by retrieving photographs or other images associated with food components from storage (e.g., storage **104)** and combining the retrieved images. In some embodiments, the user may select a filter menu **530** (FIG. 17) to further sort meals or food components by diet, food type, allergies, or categories.

[0063] Referring to FIG. 18, upon making the user's food selections, the interface **500** may present a screen **532** showing a recap of the user's selections, including meals **534**, **536**, **538**. FIG. 19 shows a customization window **540** from which a user may customize the selection of food components within in a meal.

[0064] FIG. 20 shows an alternative or additional method of retrieving meal selection data via interface **600**. Interface **600** can present the user one or more questions **602**, **606**, **610** to which the user can answer. The user may answer the questions using responses options **604**, **608**, **612** that can be text boxes, button, drop-down menu selections, radio button selections, or

selectable options. When the user has completed their answer, they can use submit option **614**, which will cause the user device **106** to transmit the data to packaging computing device **110**.

[0065] Referring back to FIG. 11, upon receiving the meal selection data from the user, packaging computing device **110** can analyze the data and use it to determine a food selection scheme (step **410**) as described above. Based on the food selection scheme, the needed food containers can be determined (step **412**). In some embodiments, a machine learning algorithm may be employed to analyze the user's selections or results and determine a number and type of food components to provide to the user. Packaging computing device **108** can also determine a type of packaging, number of packaging options (e.g., 3 or 6 containers in a container sleeve), a size of packaging, or other packaging related information based on the user's selections and include this information in the food selection scheme.

[0066] Once the needed food containers are determined, instructions can be sent to load the corresponding containers into a container sleeve (step **414**). The instructions can be sent to a display or to a packaging device **114**, as described above. Accordingly, a human packer or the packaging device **114** can retrieve the need containers and load them into a container sleeve. Additionally, in some embodiments, the instructions may include instructions to fill empty containers with certain food components. The instructions may also indicate a specific size or type of container or container sleeve, based on the meal selection scheme. For example, meals that are larger in volume or weight than other may receive larger containers. As another example, a meal with more components may receive a container sleeve with additional compartments. As another example, the meal selection data can include an indication of total meal volume and the amounts of the first, second, and third components can be based determined based on the total meal volume. As another example, a meal size can be determined based on the meal selection data and the container sleeve can be selected and obtained based on the meal size. Similarly, the food containers may be selected based on the corresponding

container sleeve size. After the containers are selected and filled, the containers can be loaded into the compartments of the container sleeve in an orientation in which the open end exposes at least a portion of the first, second, and third containers; and the exposed portions of the first, second, and third trays display an identifier.

[0067] The instructions can further include instructions to generate or print a packaging label to be placed on food containers. The packaging label can include identifier **208**, which, as described above, can include one or more of a name, food type, expiration date, or machine-readable identifier. After the label is generated and printed, a human packer or packaging device **114** can place the label on a corresponding food container. In some embodiments, a composite label can be generated and printed. The composite label can indicate the components of a meal placed within a single container sleeve **200**. The composite label can include composite nutritional information that indicates combined nutritional information for the food components comprising the meal (e.g., total calories, total macronutrients, total micronutrients, etc. for the entire meal). The composite label can then be placed on a corresponding container sleeve.

[0068] The system's data store also may contain inventory information identifying meals and/or meal components that have been shipped to each user but not yet used by the user. The packer (prior to shipment of each meal component container sleeve) or an end consumer (upon receipt or upon using a meal component in a sleeve) can scan the identifier of that sleeve (e.g., with a barcode scanner, smartphone, or other capable electronic device). In response on the scanning, an inventory of food components that is associated with an individual can be updated. For example, on the shipping side, an inventory of shipped food components for a particular user can be updated by scanning the sleeves of each meal components prior to shipment to the user. On the end user side, the user can scan the components with the client device **106** upon receipt and/or upon use and have an inventory of the components in their

possession updated. This inventory may be stored locally or sent to server **102**. If sent to server **102**, the meal configuration engine can provide updated meal suggestions to the user based on the components the user currently has in possession. For example, the meal configuration engine can analyze the available food components and create new meal combinations based on the available components. These suggestions can provide the end user with some variety in their meals that they may not otherwise enjoy.

[0069] Other advantages of the present invention can be apparent to those skilled in the art from the foregoing specification. Accordingly, it will be recognized by those skilled in the art that changes or modifications may be made to the above-described embodiments without departing from the broad inventive concepts of the invention. It should therefore be understood that this invention is not limited to the particular embodiments described in this document, but is intended to include all changes and modifications that are within the scope and spirit of the invention as defined in the claims.

[0070] As used in this document, the singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise. Unless defined otherwise, all technical and scientific terms used herein have the same meanings as commonly understood by one of ordinary skill in the art. As used in this document, the term "comprising" (or "comprises") means "including (or includes), but not limited to." When used in this document, the term "exemplary" is intended to mean "by way of example" and is not intended to indicate that a particular exemplary item is preferred or required.

[0071] In this document, when terms such "first" and "second" are used to modify a noun, such use is simply intended to distinguish one item from another, and is not intended to require a sequential order unless specifically stated. The term "approximately," when used in connection with a numeric value, is intended to include values that are close to, but not

exactly, the number. For example, in some embodiments, the term "approximately" may include values that are within +/- 10 percent of the value.

[0072] In this document, the term "connected", when referring to two physical structures, means that the two physical structures touch each other. Devices that are connected may be secured to each other, or they may simply touch each other and not be secured.

[0073] When used in this document, terms such as "top" and "bottom," "upper" and "lower", or "front" and "rear," are not intended to have absolute orientations but are instead intended to describe relative positions of various components with respect to each other. For example, a first component may be an "upper" component and a second component may be a "lower" component when a device of which the components are a part is oriented in a first direction. The relative orientations of the components may be reversed, or the components may be on the same plane, if the orientation of the structure that contains the components is changed. The claims are intended to include all orientations of a device containing such components.

[0074] This disclosure is not limited to the particular systems, methodologies or protocols described, as these may vary. The terminology used in this description is for the purpose of describing the particular versions or embodiments only, and is not intended to limit the scope.

[0075] Without excluding further possible embodiments, certain example embodiments are summarized in the following clauses:

[0076] Clause 1: A meal packaging system, comprising:

a divided packaging that includes:

an outer shell defining an interior, and

at least one divider disposed within the outer shell, which divider divides the interior into a plural number of container compartments having compartment dimensions;

a plurality of food containers, each of which is configured and dimensioned to fit within at least one of the container compartments; and

a computing device having a processor configured to execute instructions to cause the computing device to:

receive food selection data;

generate a food selection scheme based on the food selection data; and

output the food selection scheme;

wherein the food selection scheme comprises instructions to place first and second of the food containers within first and second of the compartments.

[0077] Clause 2: The meal packaging system of clause 1, further comprising a user electronic device configured to receive food selections from a user and transmit the food selection data to the computing device

[0078] Clause 3: The meal packaging system of any of the preceding clauses, wherein outputting the food selection scheme comprises displaying an indication of the first and second food containers.

[0079] Clause 4: The meal packaging system of any of the preceding clauses, wherein outputting the food selection scheme comprises displaying an indication of options or meal combinations based on the food selection data.

[0080] Clause 5: The meal packaging system of any of the preceding clauses, wherein at least one of the plurality of food containers are dimensioned to have an interference fit with the divided packaging.

[0081] Clause 6: The meal packaging system of any of the preceding clauses, wherein the divided packaging comprises a sleeve comprising four sides defining an interior.

[0082] Clause 7: The meal packaging system of any of the preceding clauses, wherein the compartments are vertically stacked.

[0083] Clause 8: The meal packaging system of any of the preceding clauses, wherein the food selection scheme includes an indication of a specific number of food containers based on a number of compartments of the divided packaging.

[0084] Clause 9: The meal packaging system of any of the preceding clauses, wherein outputting the food selection scheme comprises sending instructions to a packaging device.

[0085] Clause 10: The meal packaging system of clause 9, wherein the packaging device comprises a container filler configured to fill the first and second food containers with corresponding food components.

[0086] Clause 11: The meal packaging system of clause 9, wherein the packaging device comprises a plurality of pre-filled food containers and is configured to load the pre-filled food containers into the divided packaging.

[0087] Clause 12: The meal packaging system of any of the preceding clauses, wherein the first container contains a first food component and the second food container contains a second food component.

[0088] Clause 13: The meal packaging system of clause 12, wherein the first food component is different from the second food component.

[0089] Clause 14: The meal packaging system of clause 13, wherein the first and second food components together comprise a meal.

[0090] Clause 15: The meal packaging system of clause 14, wherein the meal is based on a volume of food.

[0091] Clause 16: The meal packaging system of clause 14, wherein the meal is based on a mass of food.

[0092] Clause 17: The meal packaging system of clause 14, wherein the meal is based on a food type of the first food component and the second food component.

[0093] Clause 18: The meal packaging system of clause 14, wherein the meal is based on a cumulative nutritional value of the first and second food components.

[0094] Clause 19: A vertical meal container, comprising:

a container sleeve defined by four sides, a first end, and a second end;

a first shelf disposed on the interior of the sleeve and attached to a first side and a second side of the four sides;

a second shelf disposed on the interior of the sleeve parallel to the first shelf and attached to the first and second sides; and

a plurality of food containers comprising four upright walls, a bottom, and an openable top;

wherein a first food container is disposed between the first shelf and a third side of the sleeve;

wherein a second food container is disposed between the first and second shelves; and

wherein a third food container is disposed between the second shelf and a fourth side of the sleeve.

[0095] Clause 20: The meal container of clause 19, further comprising a handle located on the fourth side of the sleeve.

[0096] Clause 21: The meal container of clause 20, wherein the handle comprises one or more openings in the fourth side.

[0097] Clause 22: The meal container of any of any of clauses 19-21, wherein the first shelf and the second shelf extend longitudinally from the first end to the second end.

[0098] Clause 23: The meal container of any of any of clauses 19-22, wherein:

the first end of the container sleeve comprises an opening;

the first and second food containers include an identifier; and

the identifier is readable through the opening.

[0099] Clause 24: The meal container of clause 23, wherein the opening is a translucent portion of the first end.

[0100] Clause 25: The meal container of clause 23, wherein the opening is a window through a portion of the first end.

[0101] Clause 26: The meal container of clause 23, wherein the opening defines an access port for adding or removing food containers from the container sleeve.

[0102] Clause 27: The meal container of any of clauses 23-26, wherein:

the container sleeve further comprises a door;

the door covers the opening when the door is in a closed position; and

the compartments are accessible when the door is in an open position.

[0103] Clause 28: The meal container of clause 27, wherein the identifier is not readable when the door is in the closed position.

[0104] Clause 29: The meal container of clause 27, wherein the identifier is readable when the door is in the closed position.

[0105] Clause 30: The meal container of any of clauses 23-29, wherein the identifier is machine-readable and comprises one or more of the following: a bar code, a QR code, an electronic tag, or an RFID tag.

[0106] Clause 31: The meal container of any of clauses 23-30, wherein the identifier comprises an expiration date.

[0107] Clause 32: The meal container of any of clauses 23-31, wherein the identifier comprises a food type.

[0108] Clause 33: The meal container of any of clauses 19-32 wherein:

the container sleeve further comprises a handle disposed on a first of the sides; and

the container sleeve further comprises an opening on a second side that is perpendicular to the first side.

[0109] Clause 34: The meal container of clause 33, wherein the handle is configured to be grasped from the top of the container sleeve.

[0110] Clause 35: The meal container of any of clauses 33-34, wherein the handle comprises one or more openings.

[0111] Clause 36: The meal container of clause 35, wherein the wherein the openings are cutouts in the first side.

[0112] Clause 37: The meal container of any of clauses 19-36, wherein the food containers are sized relative to the container sleeve such that the container sleeve applies pressure to two opposite sides of the container sleeve.

[0113] Clause 38, The meal container of any of clauses 19-37, wherein:

the first end of the container sleeve is open; and

the second end of the container sleeve is closed.

[0114] Clause 39: A method for providing packaged meals, comprising: receiving, by a processor, meal selection data;

determining, by the processor and based on the meal selection data, a meal comprising a first food component, a second food component, and a third food component;

filling a first container with an amount of the first component;

filling a second container with an amount of the second component;

filling a third container with an amount of the third component;

obtaining a container sleeve comprising an outer wrap, an open end, and three compartments defined by a first shelf and a second shelf; and

loading the first, second, and third containers into the compartments of the container sleeve.

[0115] Clause 40: The method of clause 39, wherein the meal selection data comprises an indication of total meal calories, and the amounts of the first, second, and third components are based on the total meal calories.

[0116] Clause 41: The method of any of clauses 39-40, wherein the meal selection data comprises an indication of total meal mass, and the amounts of the first, second, and third components are based on the total meal mass.

[0117] Clause 42: The method of any of clauses 39-41, wherein the meal selection data comprises an indication of a cumulative nutritional value, and the amounts of the first, second, and third components are based on the cumulative nutritional value.

[0118] Clause 43: The method of any of clauses 39-42, wherein the meal selection data comprises an indication of total meal volume and the amounts of the first, second, and third components are based on the total meal volume.

[0119] Clause 44: The method of any of clauses 39-43, further comprising determining a meal size based on the meal selection data;

wherein obtaining the container sleeve is based on the meal size; and

wherein the first, second, and third containers have a size corresponding to the container sleeve size.

[0120] Clause 45: The method of any of clauses 39-44, further comprising sealing the filled first, second, and third containers.

[0121] Clause 46: The method of any of clauses 39-45, wherein:

the first, second, and third containers are loaded into the compartments of the container sleeve in an orientation in which the open end exposes at least a portion of the first, second, and third containers; and

the exposed portions of the first, second, and third containers display an identifier.

[0122] Clause 47: The method of clause 46, further comprising:

scanning the identifier; and

updating, based on the scanning, an inventory of food components that is associated with an individual.

CLAIMS

What is claimed is:

1. A meal packaging system, comprising:

a divided packaging that includes:

an outer shell defining an interior, and

at least one divider disposed within the outer shell, which divider divides the interior into a plural number of container compartments having compartment dimensions;

a plurality of food containers, each of which is configured and dimensioned to fit within at least one of the container compartments; and

a computing device having a processor configured to execute instructions to cause the computing device to:

receive food selection data;

generate a food selection scheme based on the food selection data; and

output the food selection scheme;

wherein the food selection scheme comprises instructions to place first and second of the food containers within first and second of the compartments.

2. The meal packaging system of claim 1, further comprising a user electronic device configured to receive food selections from a user and transmit the food selection data to the computing device.

3. The meal packaging system of claim 1, wherein outputting the food selection scheme comprises displaying an indication of the first and second food containers.

4. The meal packaging system of claim 1, wherein outputting the food selection scheme comprises displaying an indication of options or meal combinations based on the food selection data.

5. The meal packaging system of claim 1, wherein at least one of the plurality of food containers are dimensioned to have an interference fit with the divided packaging.

6. The meal packaging system of claim 1, wherein the divided packaging comprises a sleeve comprising four sides defining an interior.

7. The meal packaging system of claim 1, wherein the compartments are vertically stacked.

8. The meal packaging system of claim 1, wherein the food selection scheme includes an indication of a specific number of food containers based on a number of compartments of the divided packaging.

9. The meal packaging system of claim 1, wherein outputting the food selection scheme comprises sending instructions to a packaging device.

10. The meal packaging system of claim 9, wherein the packaging device comprises a container filler configured to fill the first and second food containers with corresponding food components.

11. The meal packaging system of claim 9, wherein the packaging device comprises a plurality of pre-filled food containers and is configured to load the pre-filled food containers into the divided packaging.

12. The meal packaging system of claim 1, wherein the first container contains a first food component and the second food container contains a second food component.

13. The meal packaging system of claim 12, wherein the first food component is different from the second food component.

14. The meal packaging system of claim 13, wherein the first and second food components together comprise a meal.

15. The meal packaging system of claim 14, wherein the meal is based on a volume of food.

16. The meal packaging system of claim 14, wherein the meal is based on a mass of food.

17. The meal packaging system of claim 14, wherein the meal is based on a food type of the first food component and the second food component.

18. The meal packaging system of claim 14, wherein the meal is based on a cumulative nutritional value of the first and second food components.

19. A vertical meal container, comprising:

a container sleeve defined by four sides, a first end, and a second end;

a first shelf disposed on the interior of the sleeve and attached to a first side and a second side of the four sides;

a second shelf disposed on the interior of the sleeve parallel to the first shelf and attached to the first and second sides; and

a plurality of food containers comprising four upright walls, a bottom, and an openable top;

wherein a first food container is disposed between the first shelf and a third side of the sleeve;

wherein a second food container is disposed between the first and second shelves; and

wherein a third food container is disposed between the second shelf and a fourth side of the sleeve.

20. The meal container of claim 19, further comprising a handle located on the fourth side of the sleeve.

21. The meal container of claim 20, wherein the handle comprises one or more openings in the fourth side.

22. The meal container of claim 19, wherein the first shelf and the second shelf extend longitudinally from the first end to the second end.

23. The meal container of claim 19, wherein:

the first end of the container sleeve comprises an opening;

the first and second food containers include an identifier; and

the identifier is readable through the opening.

24. The meal container of claim 23, wherein the opening is a translucent portion of the first end.

25. The meal container of claim 23, wherein the opening is a window through a portion of the first end.

26. The meal container of claim 23, wherein the opening defines an access port for adding or removing food containers from the container sleeve.

27. The meal container of claim 23, wherein:

the container sleeve further comprises a door;

the door covers the opening when the door is in a closed position; and

the compartments are accessible when the door is in an open position.

28. The meal container of claim 27, wherein the identifier is not readable when the door is in the closed position.

29. The meal container of claim 27, wherein the identifier is readable when the door is in the closed position.

30. The meal container of claim 23, wherein the identifier is machine-readable and comprises one or more of the following: a bar code, a QR code, an electronic tag, or an RFID tag.

31. The meal container of claim 23, wherein the identifier comprises an expiration date.

32. The meal container of claim 23, wherein the identifier comprises a food type.

33. The meal container of claim 19, wherein:

the container sleeve further comprises a handle disposed on a first of the sides; and

the container sleeve further comprises an opening on a second side that is perpendicular to the first side.

34. The meal container of claim 33, wherein the handle is configured to be grasped from the top of the container sleeve.

35. The meal container of claim 33, wherein the handle comprises one or more openings.

36. The meal container of claim 35, wherein the openings are cutouts in the first side.

37. The meal container of claim 19, wherein the food containers are sized relative to the container sleeve such that the container sleeve applies pressure to two opposite sides of the container sleeve.

38. The meal container of claim 19, wherein:

the first end of the container sleeve is open; and

the second end of the container sleeve is closed.

39. A method for providing packaged meals, comprising:

receiving, by a processor, meal selection data;

determining, by the processor and based on the meal selection data, a meal comprising a first food component, a second food component, and a third food component;

filling a first container with an amount of the first component;

filling a second container with an amount of the second component;

filling a third container with an amount of the third component;

obtaining a container sleeve comprising an outer wrap, an open end, and three compartments defined by a first shelf and a second shelf; and

loading the first, second, and third containers into the compartments of the container sleeve.

40. The method of claim 39, wherein the meal selection data comprises an indication of total meal calories, and the amounts of the first, second, and third components are based on the total meal calories.

41. The method of claim 39, wherein the meal selection data comprises an indication of total meal mass, and the amounts of the first, second, and third components are based on the total meal mass.

42. The method of claim 39, wherein the meal selection data comprises an indication of a cumulative nutritional value, and the amounts of the first, second, and third components are based on the cumulative nutritional value.

43. The method of claim 39, wherein the meal selection data comprises an indication of total meal volume and the amounts of the first, second, and third components are based on the total meal volume.

44. The method of claim 39, further comprising determining a meal size based on the meal selection data;

wherein obtaining the container sleeve is based on the meal size; and

wherein the first, second, and third containers have a size corresponding to the container sleeve size.

45. The method of claim 39, further comprising sealing the filled first, second, and third containers.

46. The method of claim 39, wherein:

the first, second, and third containers are loaded into the compartments of the container sleeve in an orientation in which the open end exposes at least a portion of the first, second, and third containers; and

the exposed portions of the first, second, and third containers display an identifier.

47. The method of claim 46, further comprising:

scanning the identifier; and

updating, based on the scanning, an inventory of food components that is associated with an individual.

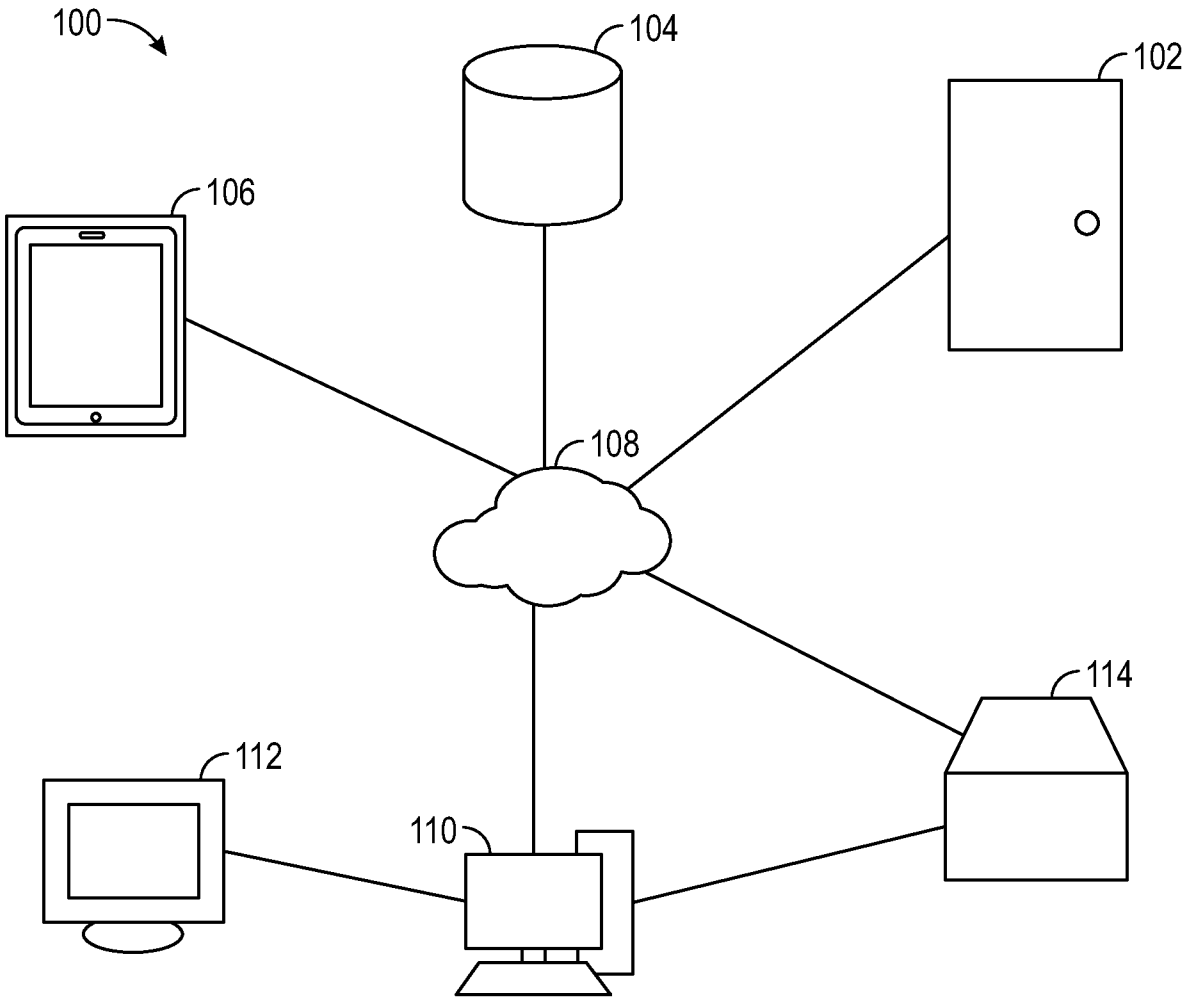

FIG. 1

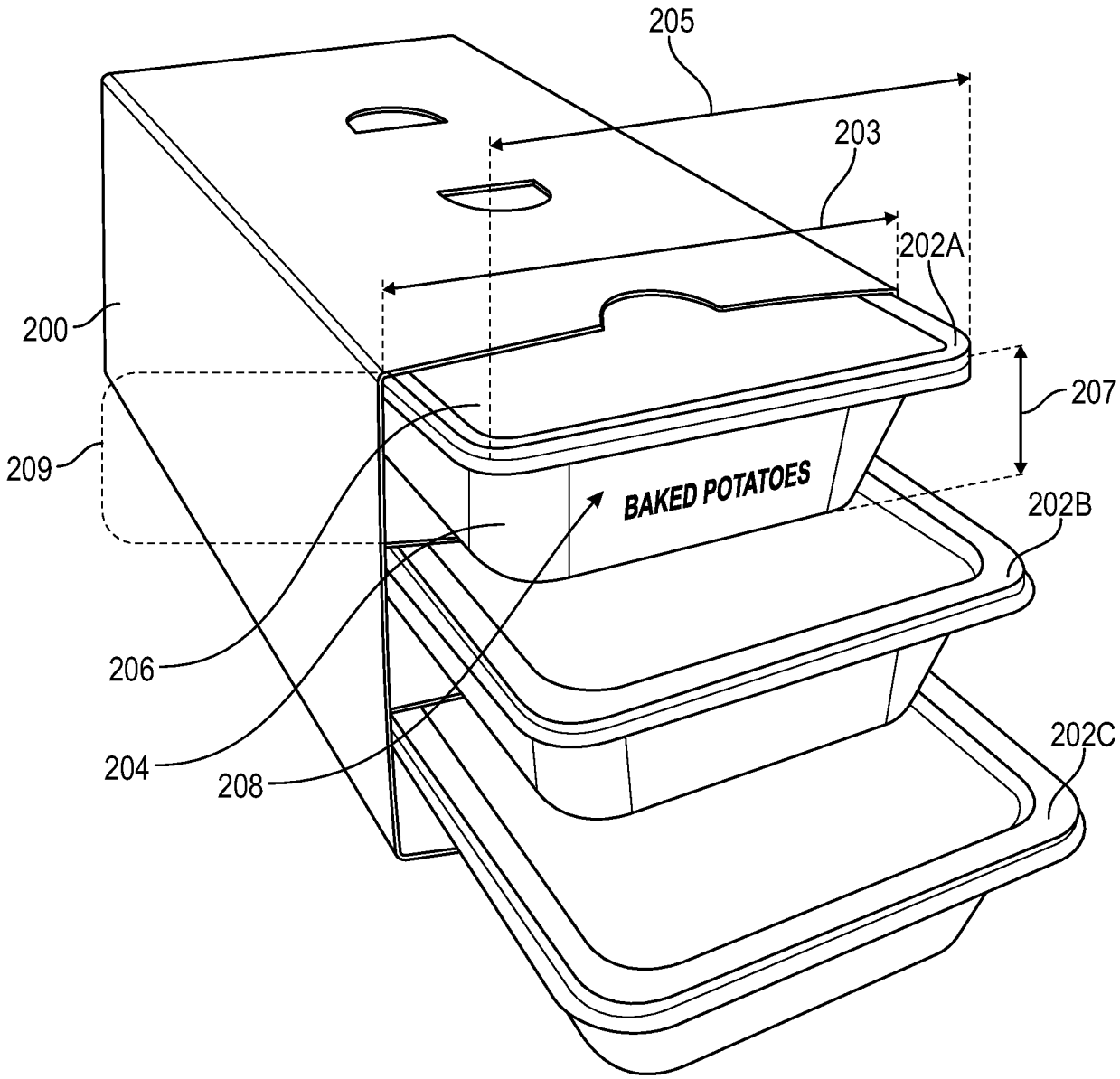

FIG. 2

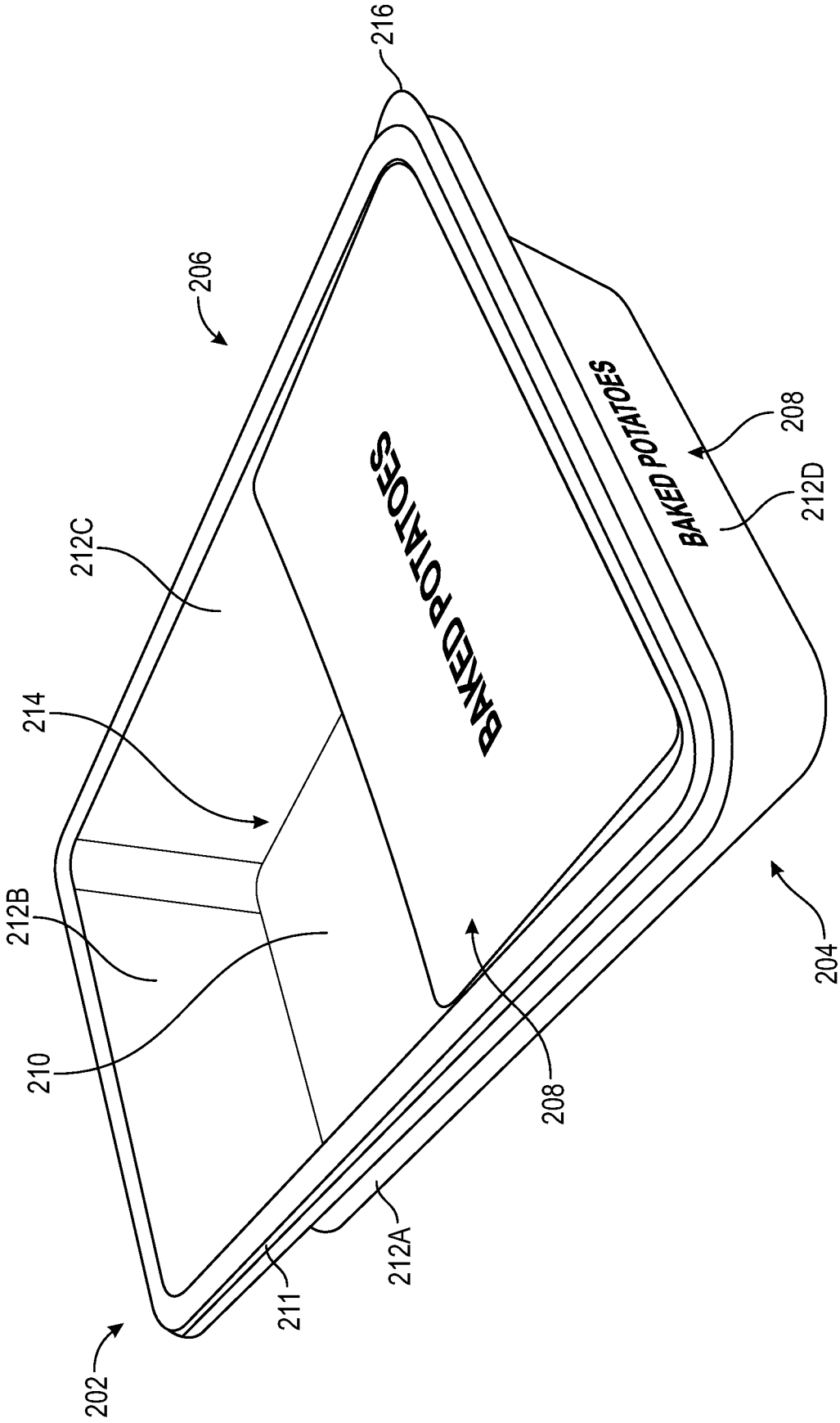
216
206
212C
214
212B
210
202
211
212A
208
204
208
212D
BAKED POTATOES
BAKED POTATOES

FIG. 3

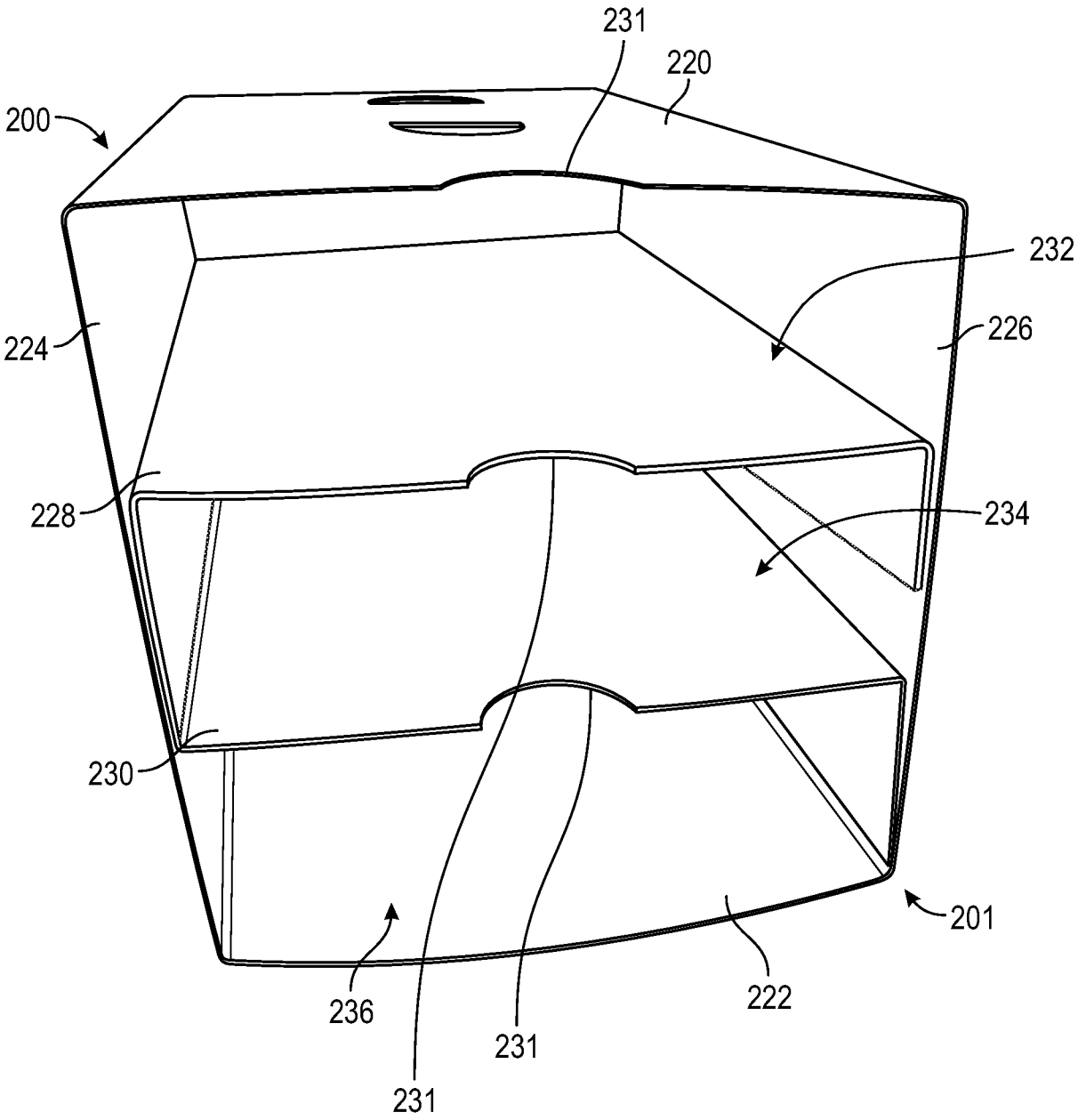

FIG. 4

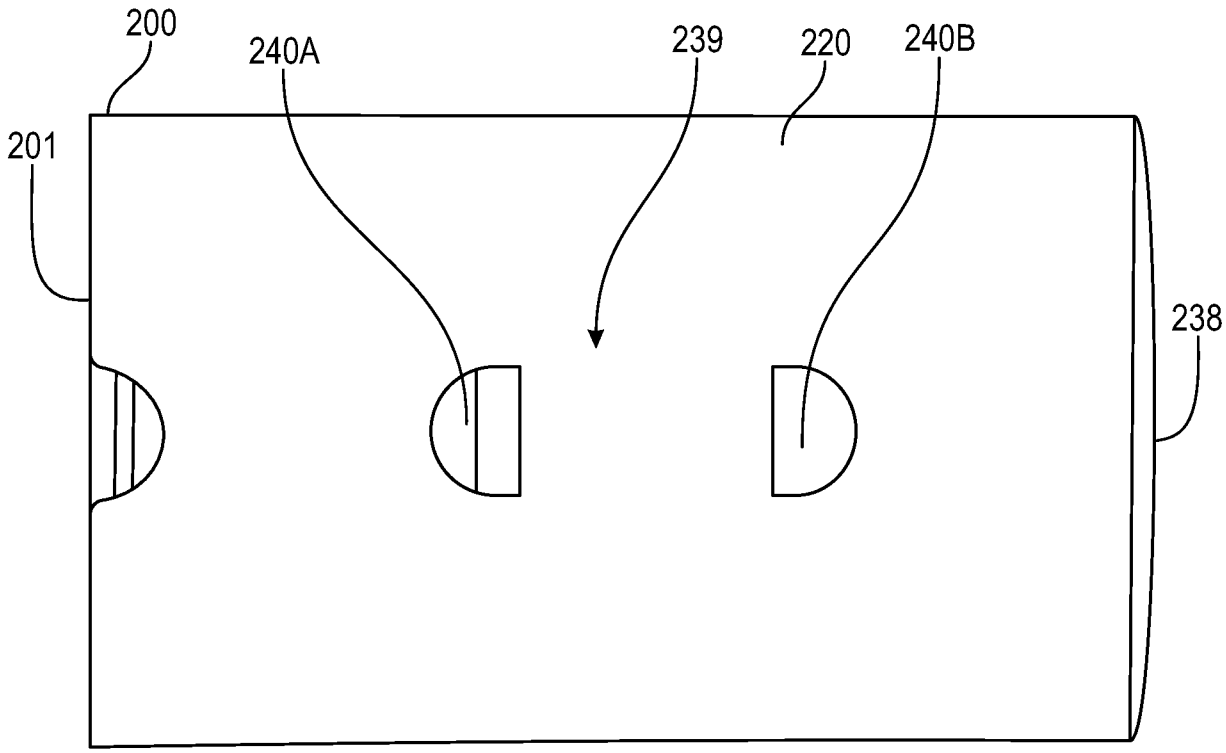

FIG. 5

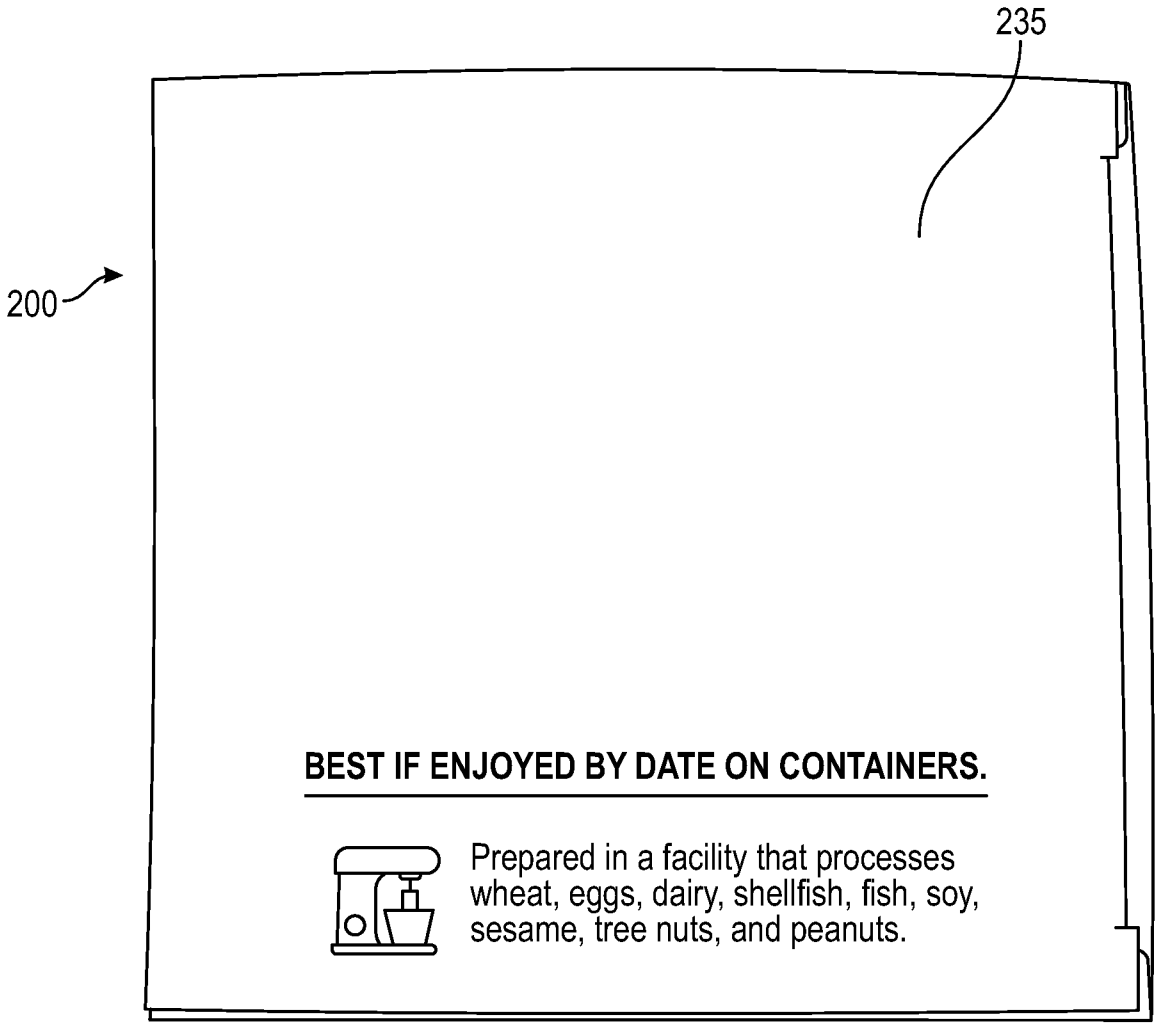
235
200
BEST IF ENJOYED BY DATE ON CONTAINERS.
Prepared in a facility that processes wheat, eggs, dairy, shellfish, fish, soy, sesame, tree nuts, and peanuts.

FIG. 6

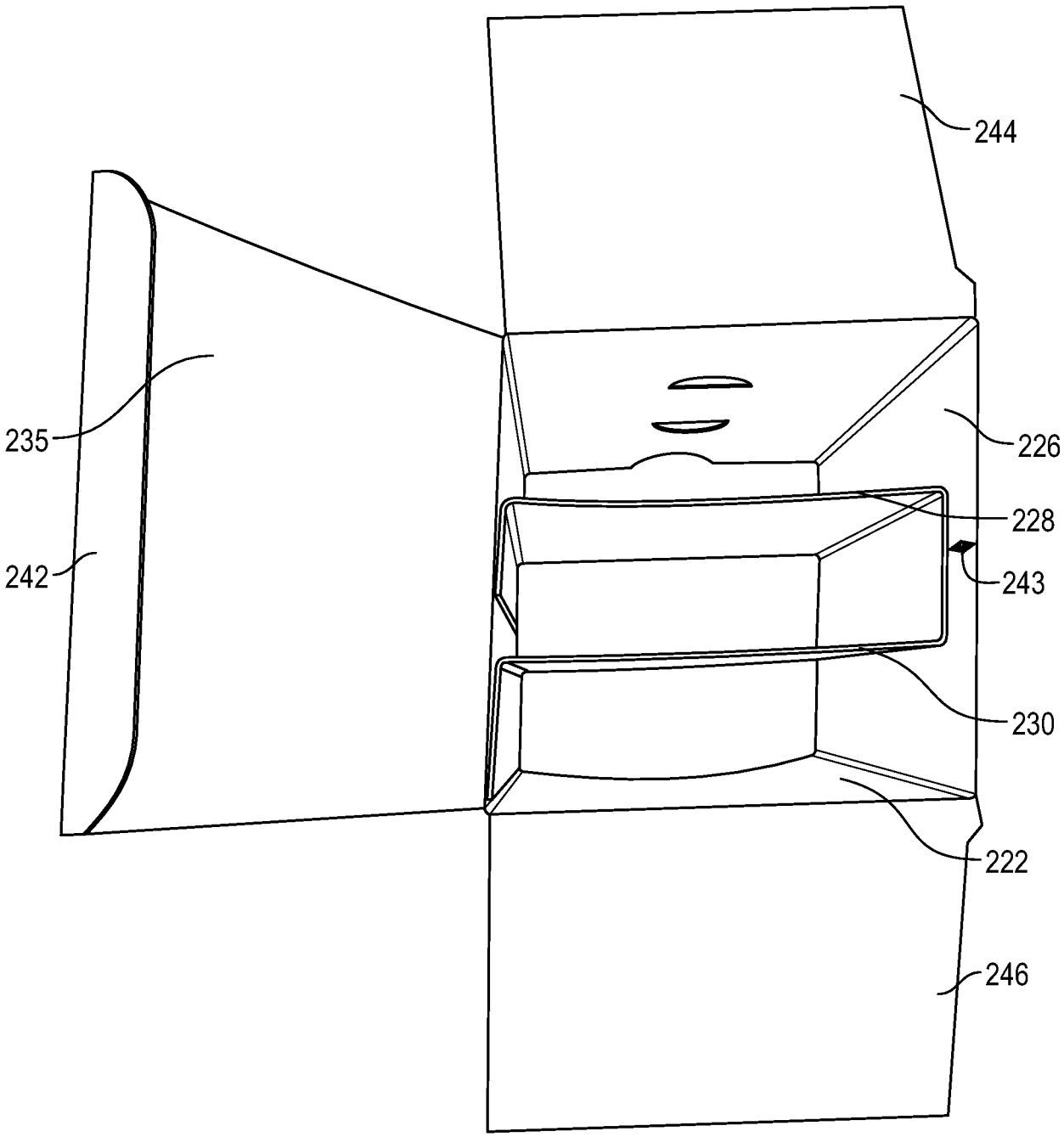

FIG. 7

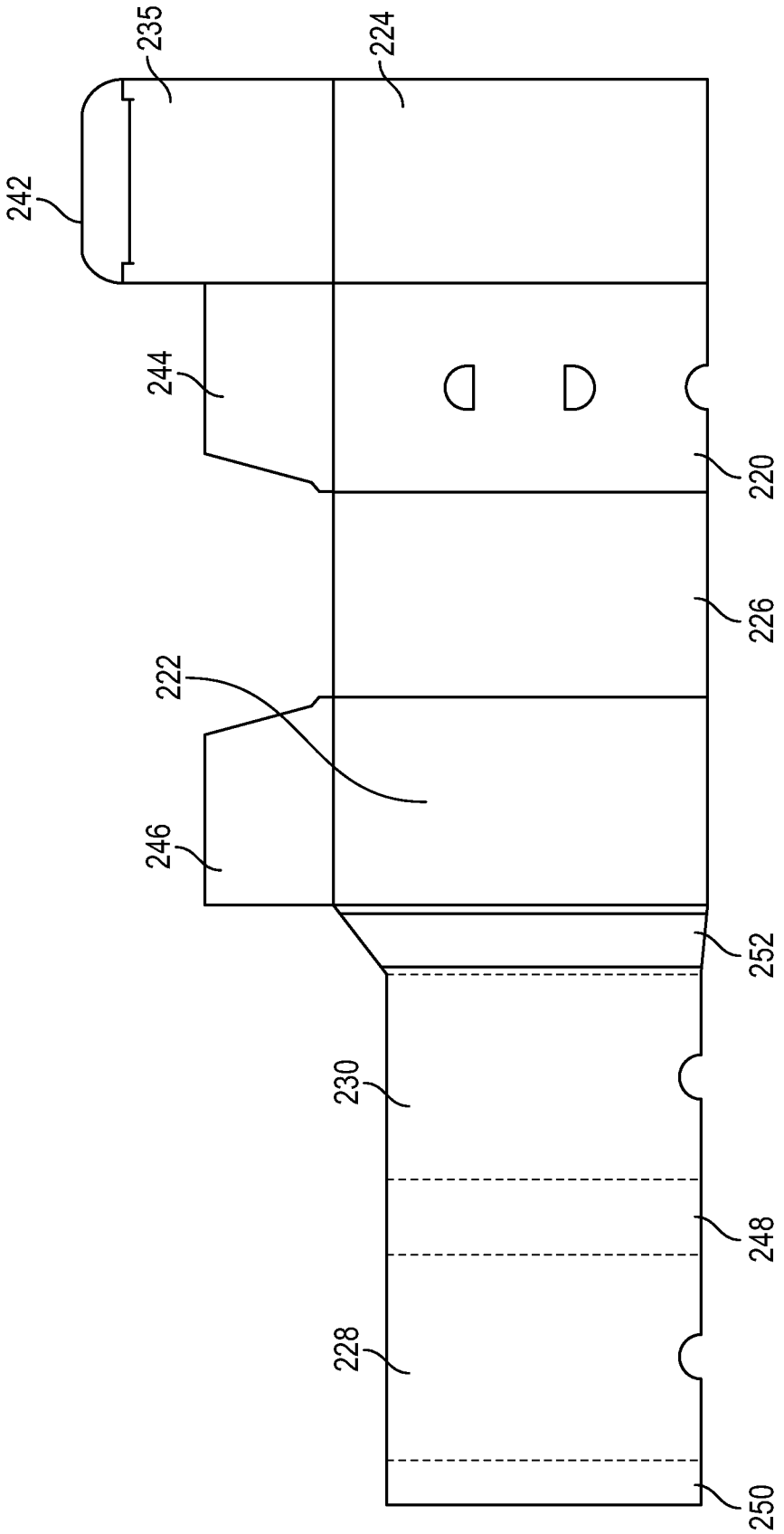

FIG. 8

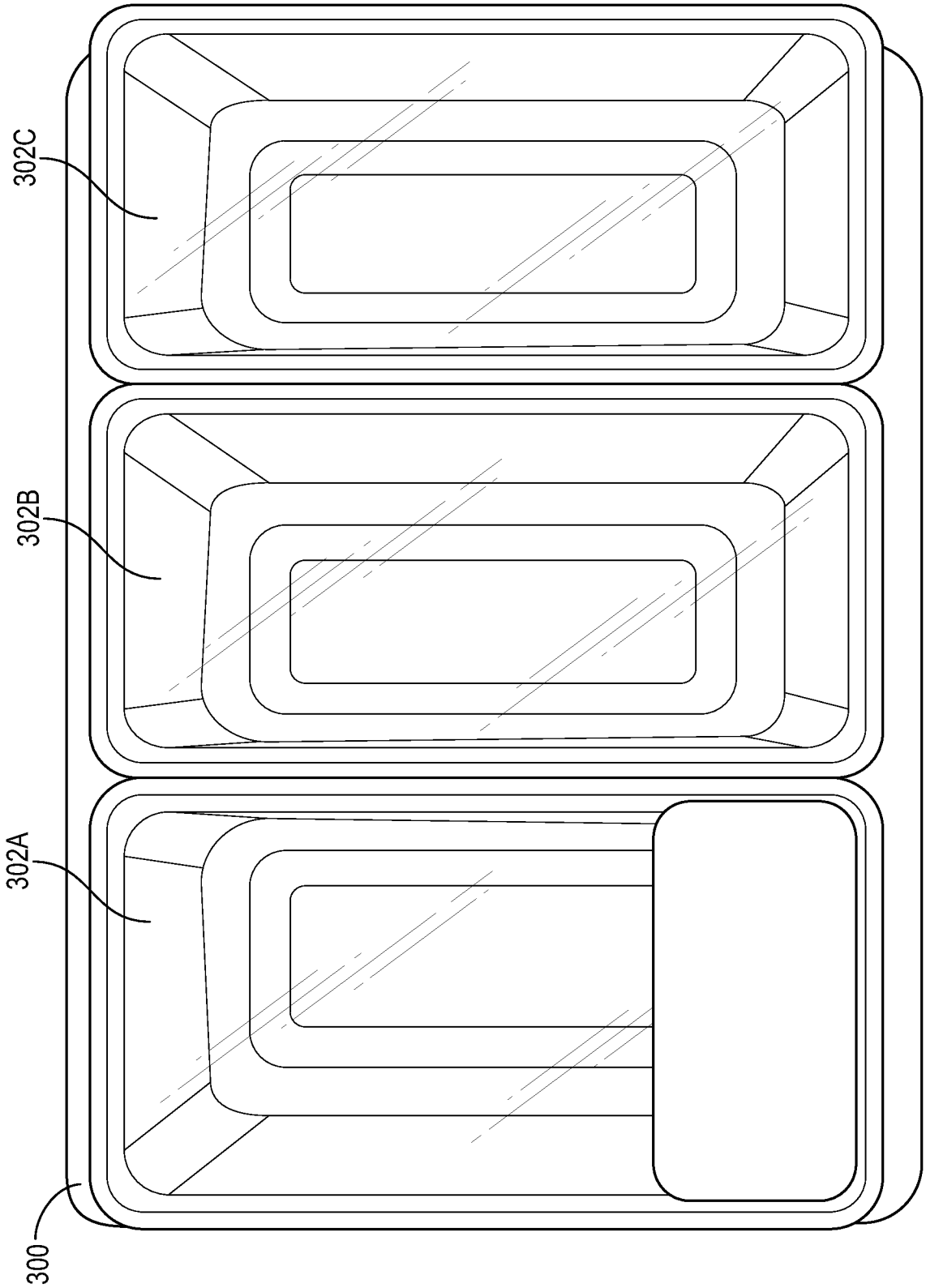

FIG. 9

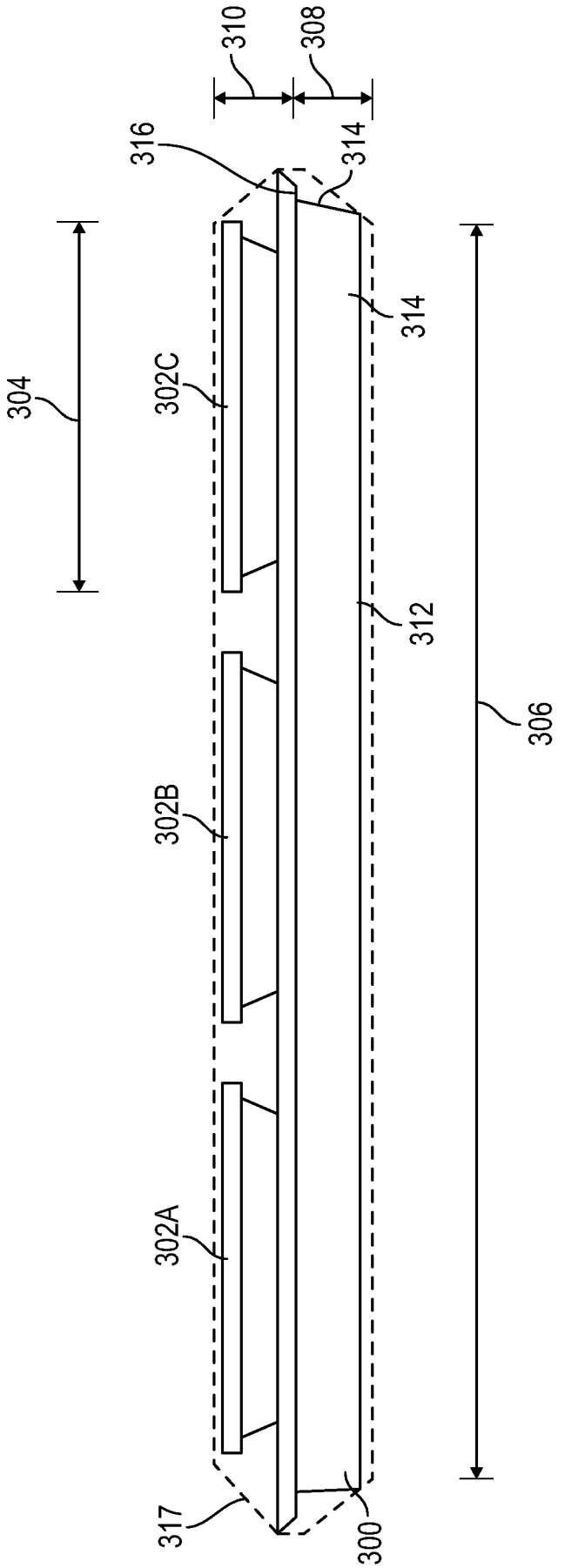

FIG. 10

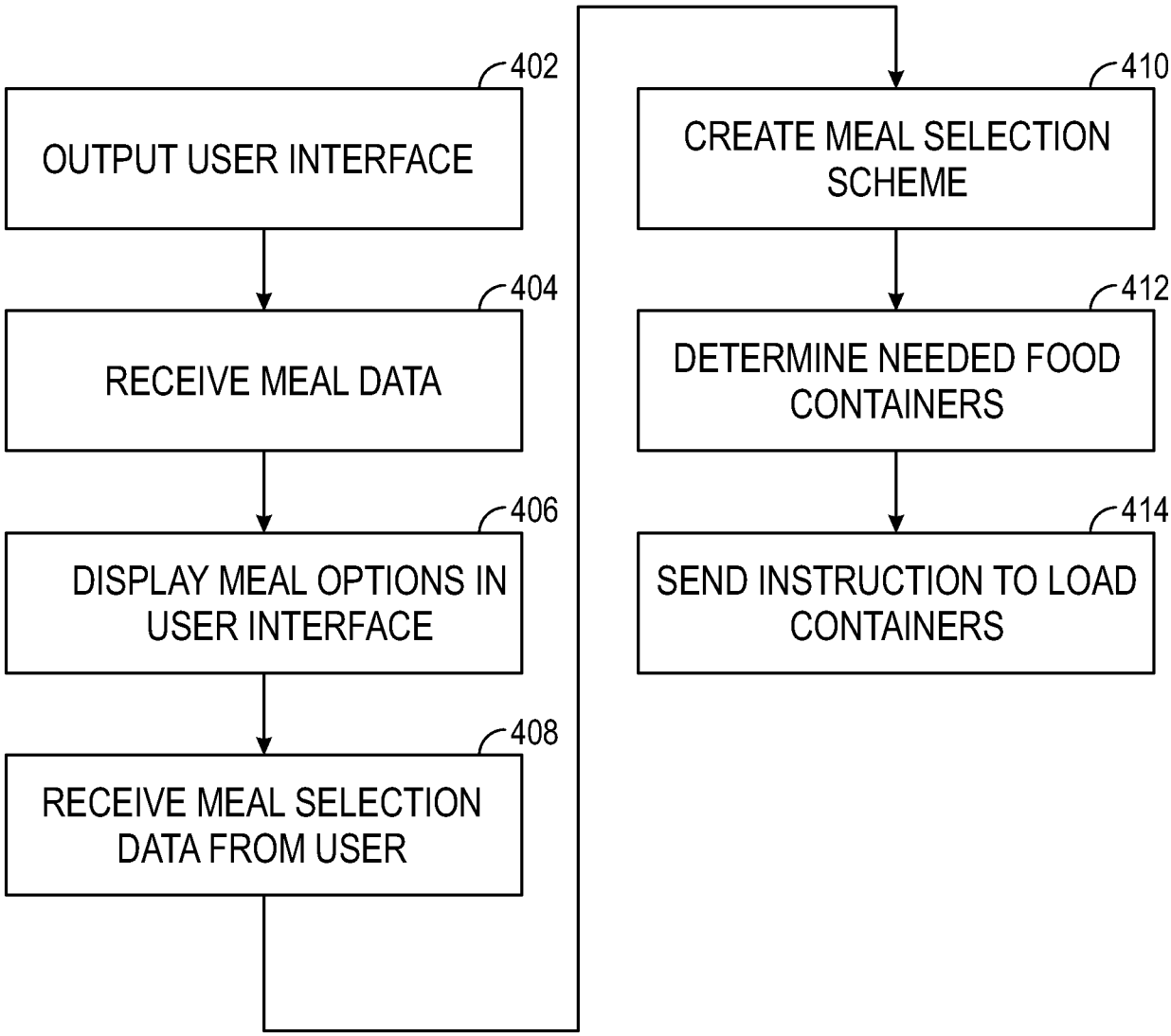
402
OUTPUT USER INTERFACE
404
RECEIVE MEAL DATA
406
DISPLAY MEAL OPTIONS IN USER INTERFACE
408
RECEIVE MEAL SELECTION DATA FROM USER
410
CREATE MEAL SELECTION SCHEME
412
DETERMINE NEEDED FOOD CONTAINERS
414
SEND INSTRUCTION TO LOAD CONTAINERS

FIG. 11

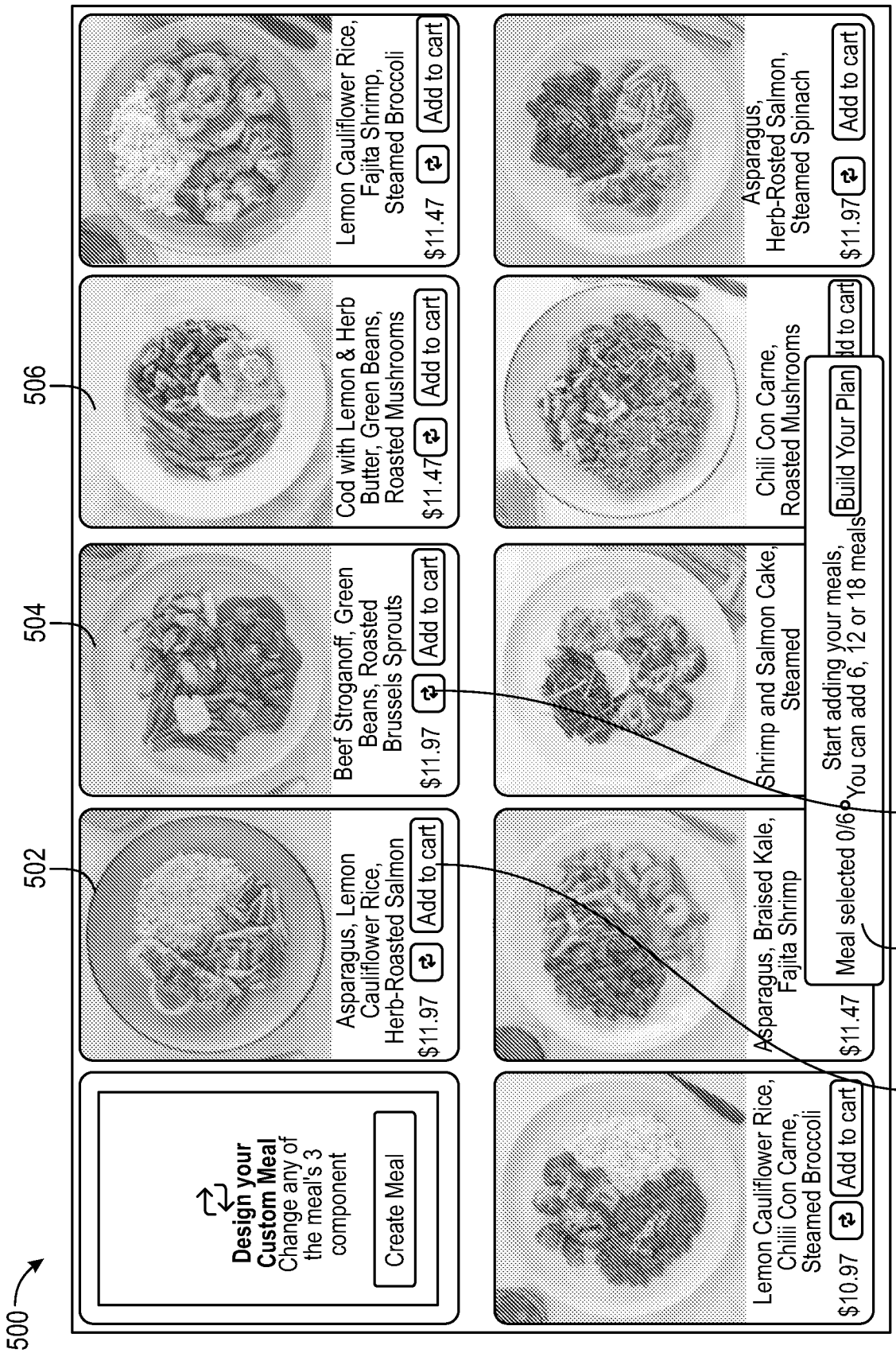
500
502
504
506
510
512
508
Design your Custom Meal
Change any of the meal's 3 component
Create Meal
Asparagus, Lemon Cauliflower Rice, Herb-Roasted Salmon
$11.97
Add to cart
Beef Stroganoff, Green Beans, Roasted Brussels Sprouts
$11.97
Add to cart
Cod with Lemon & Herb Butter, Green Beans, Roasted Mushrooms
$11.47
Add to cart
Lemon Cauliflower Rice, Fajita Shrimp, Steamed Broccoli
$11.47
Add to cart
Lemon Cauliflower Rice, Chilli Con Carne, Steamed Broccoli
$10.97
Add to cart
Asparagus, Braised Kale, Fajita Shrimp
$11.47
Shrimp and Salmon Cake, Steamed
Chili Con Carne, Roasted Mushrooms
Asparagus, Herb-Rosted Salmon, Steamed Spinach
$11.97
Add to cart
Meal selected 0/6
Start adding your meals, You can add 6, 12 or 18 meals
Build Your Plan

FIG. 12

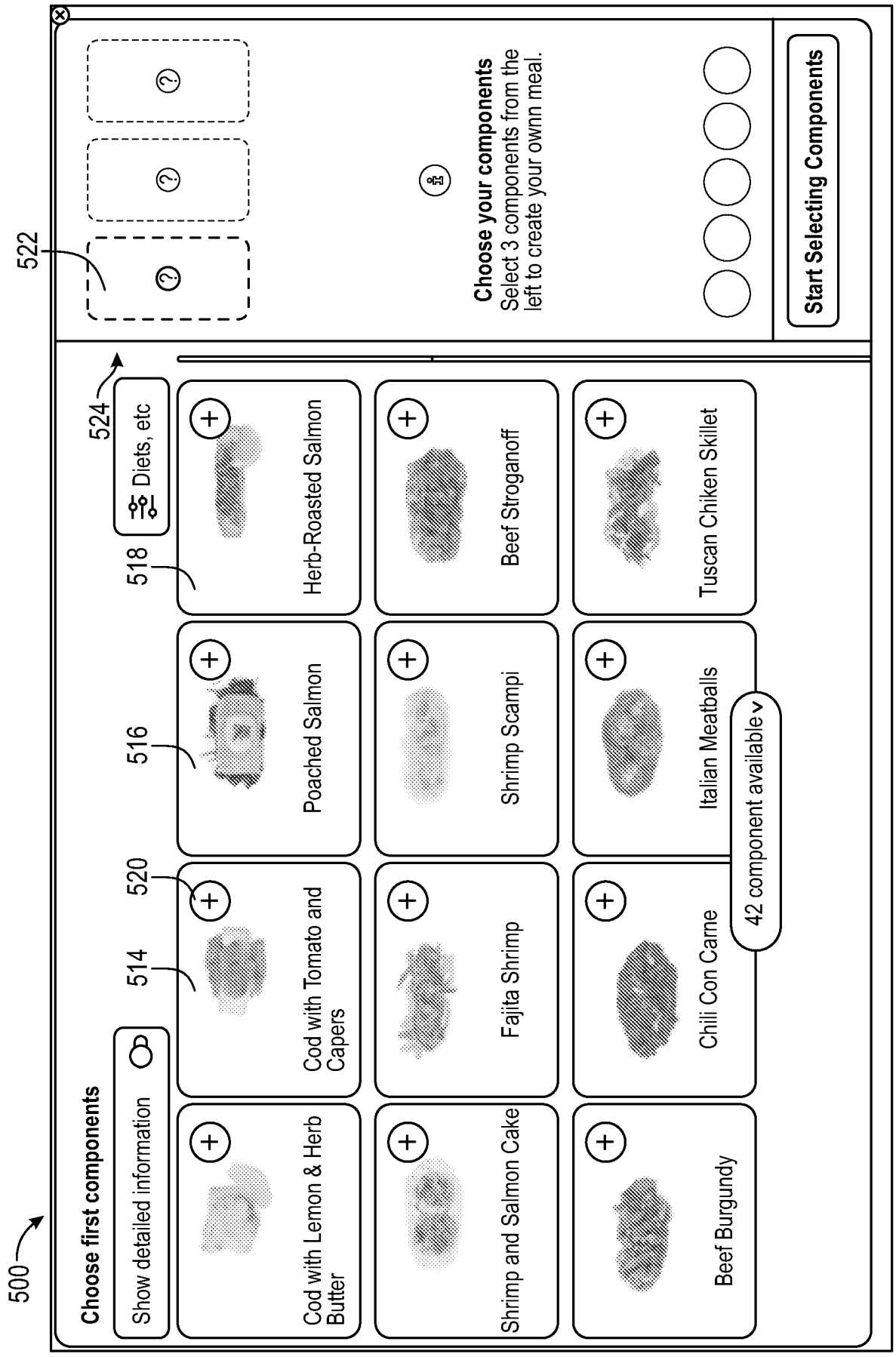
500
Choose first components
Show detailed information
514
520
516
518
524
Diets, etc
522
Cod with Lemon & Herb Butter
Cod with Tomato and Capers
Poached Salmon
Herb-Roasted Salmon
Shrimp and Salmon Cake
Fajita Shrimp
Shrimp Scampi
Beef Stroganoff
Beef Burgundy
Chili Con Carne
Italian Meatballs
Tuscan Chiken Skillet
42 component available
Choose your components
Select 3 components from the left to create your ownn meal.
Start Selecting Components

FIG. 13

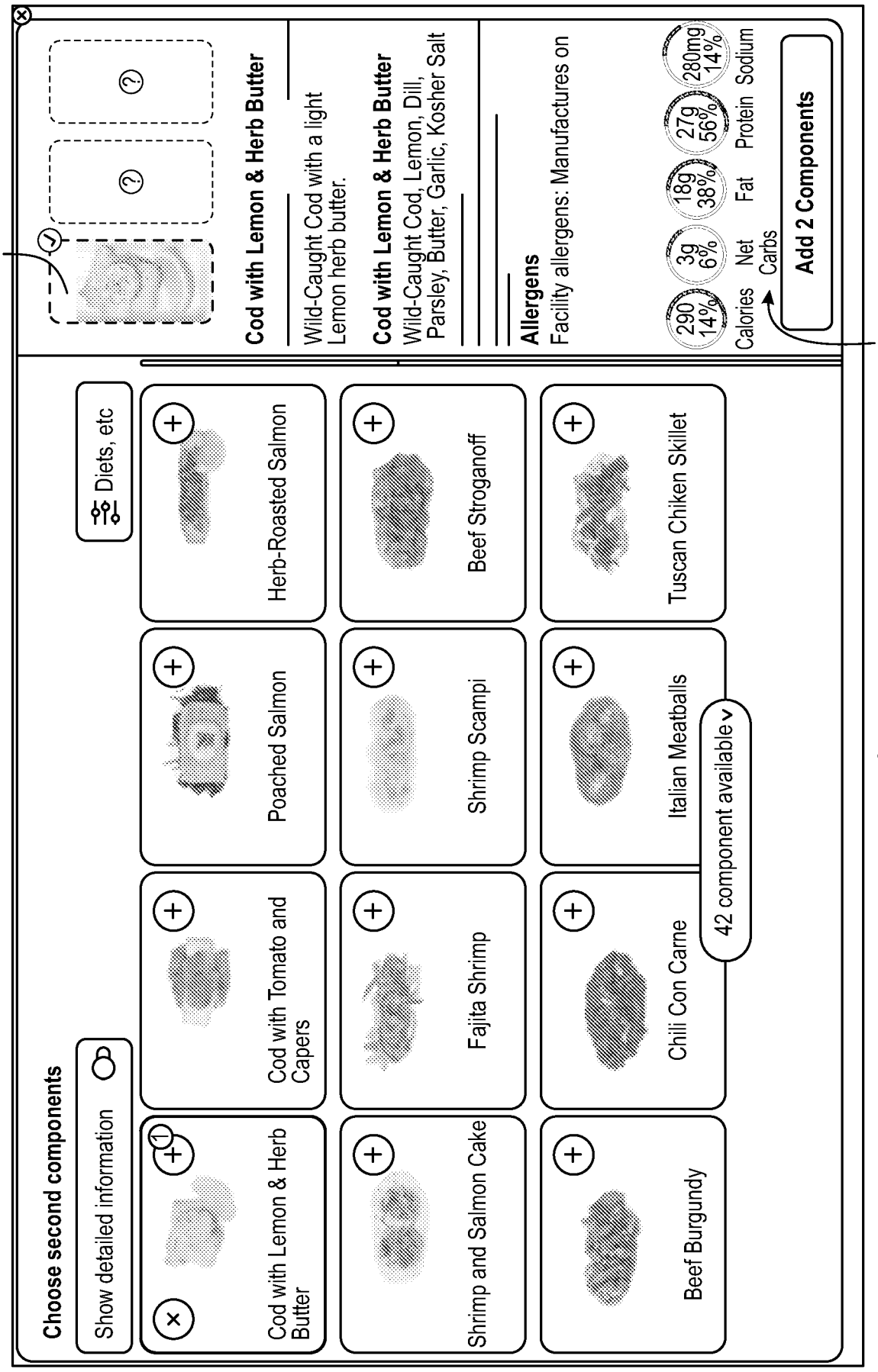
526
Choose second components
Show detailed information
Diets, etc
Cod with Lemon & Herb Butter
Cod with Tomato and Capers
Poached Salmon
Herb-Roasted Salmon
Shrimp and Salmon Cake
Fajita Shrimp
Shrimp Scampi
Beef Stroganoff
Beef Burgundy
Chili Con Carne
Italian Meatballs
Tuscan Chiken Skillet
42 component available
Cod with Lemon & Herb Butter
Wild-Caught Cod with a light Lemon herb butter.
Cod with Lemon & Herb Butter
Wild-Caught Cod, Lemon, Dill, Parsley, Butter, Garlic, Kosher Salt
Allergens
Facility allergens: Manufactures on
Calories 290 14%
Net Carbs 3g 6%
Fat 18g 38%
Protein 27g 56%
Sodium 280mg 14%
Add 2 Components
528

FIG. 14

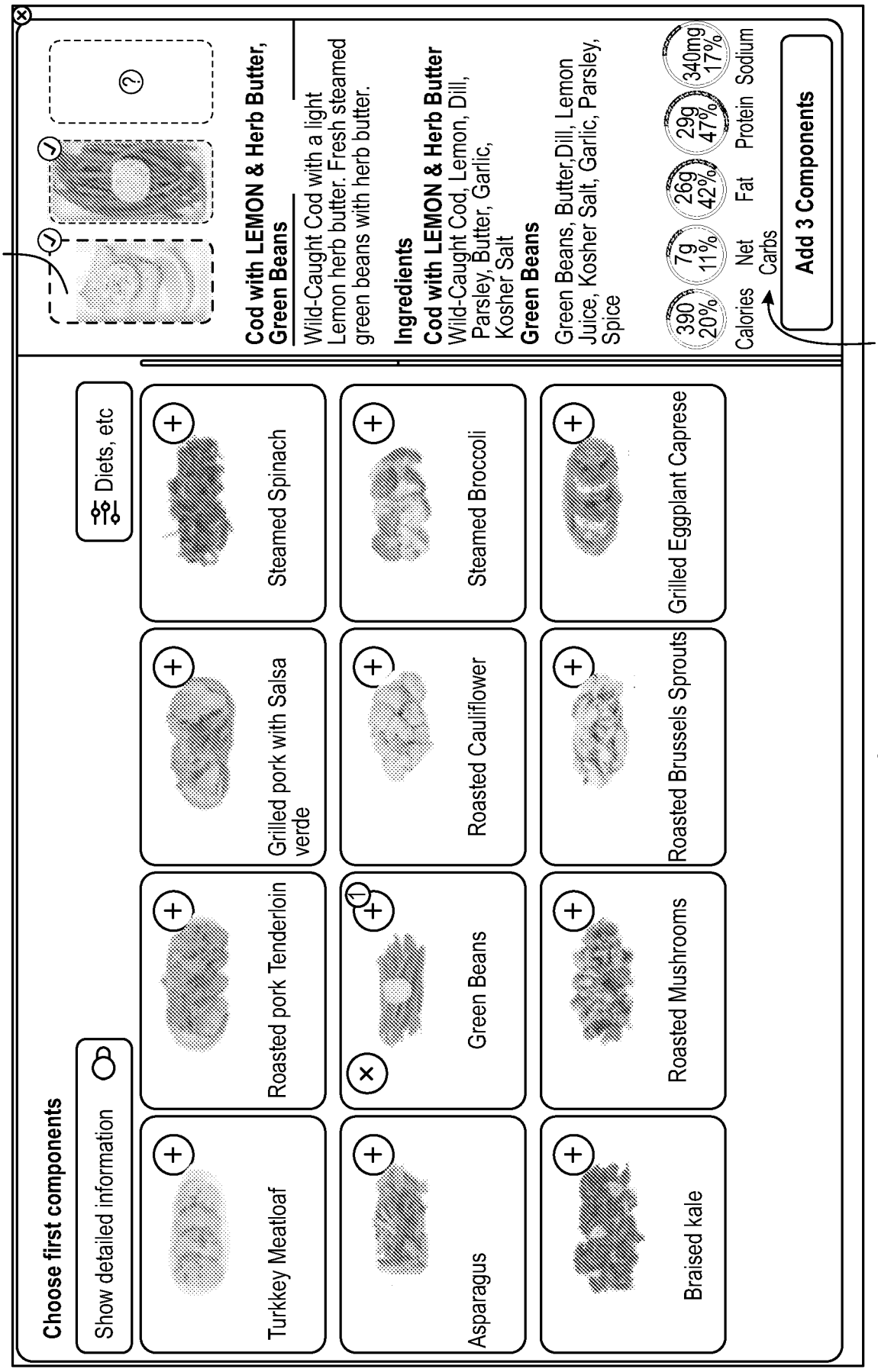
522
Choose first components
Show detailed information
Diets, etc
Turkkey Meatloaf
Roasted pork Tenderloin
Grilled pork with Salsa verde
Steamed Spinach
Asparagus
Green Beans
Roasted Cauliflower
Steamed Broccoli
Braised kale
Roasted Mushrooms
Roasted Brussels Sprouts
Grilled Eggplant Caprese
Cod with LEMON & Herb Butter, Green Beans
Wild-Caught Cod with a light Lemon herb butter. Fresh steamed green beans with herb butter.
Ingredients
Cod with LEMON & Herb Butter
Wild-Caught Cod, Lemon, Dill, Parsley, Butter, Garlic, Kosher Salt
Green Beans
Green Beans, Butter,Dill, Lemon Juice, Kosher Salt, Garlic, Parsley, Spice
Calories 390 20%
Net Carbs 7g 11%
Fat 26g 42%
Protein 29g 47%
Sodium 340mg 17%
Add 3 Components
528

FIG. 15

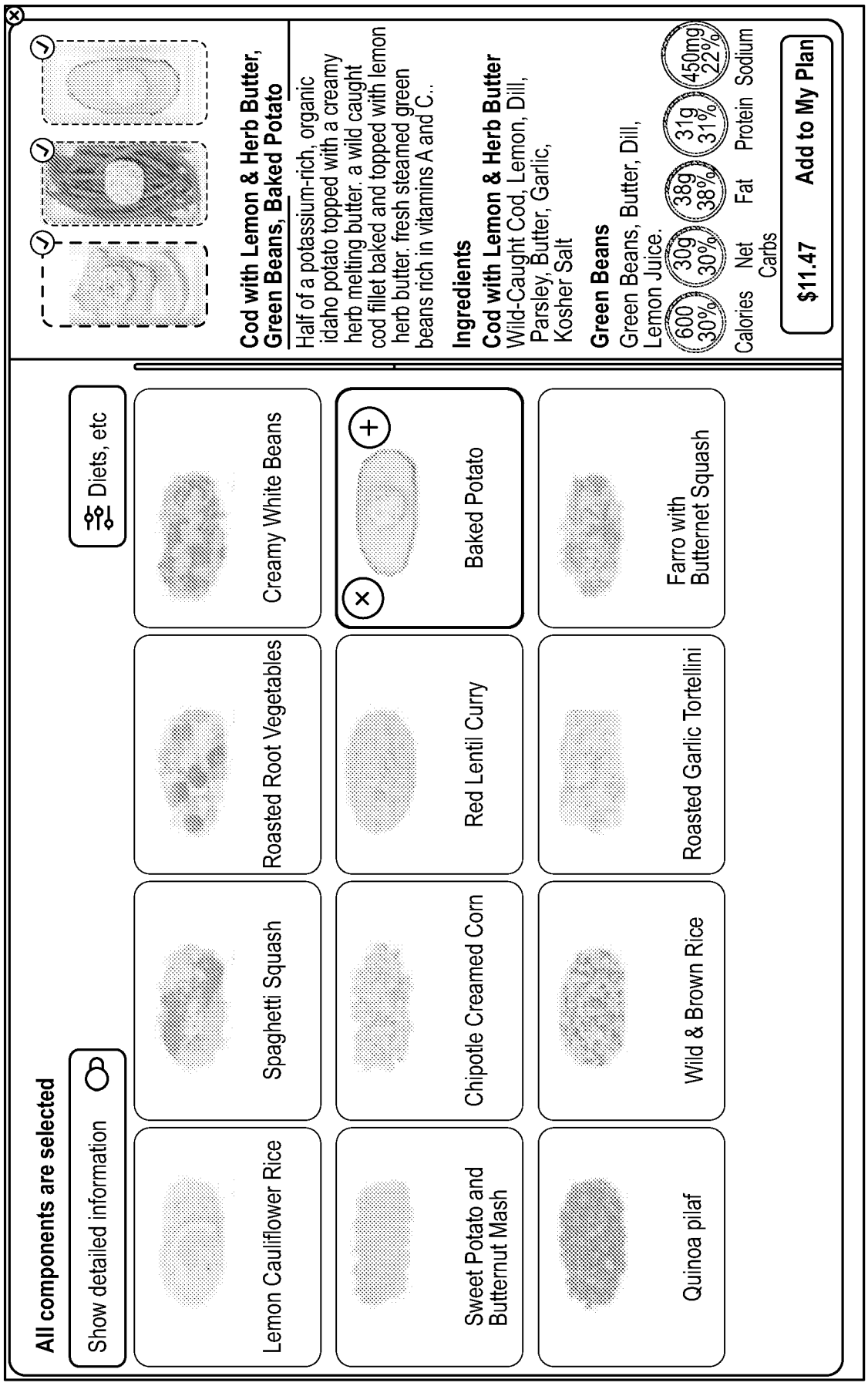
All components are selected
Show detailed information
Diets, etc
Lemon Cauliflower Rice
Spaghetti Squash
Creamy White Beans
Sweet Potato and Butternut Mash
Chipotle Creamed Corn
Roasted Root Vegetables
Quinoa pilaf
Wild & Brown Rice
Red Lentil Curry
Roasted Garlic Tortellini
Baked Potato
Farro with Butternet Squash
Cod with Lemon & Herb Butter, Green Beans, Baked Potato
Half of a potassium-rich, organic idaho potato topped with a creamy herb melting butter. a wild caught cod fillet baked and topped with lemon herb butter. fresh steamed green beans rich in vitamins A and C..
Ingredients
Cod with Lemon & Herb Butter
Wild-Caught Cod, Lemon, Dill, Parsley, Butter, Garlic, Kosher Salt
Green Beans
Green Beans, Butter, Dill, Lemon Juice.
600 30%
30g 30%
38g 38%
31g 31%
450mg 22%
Calories Net Carbs
Fat
Protein
Sodium
$11.47
Add to My Plan

FIG. 16

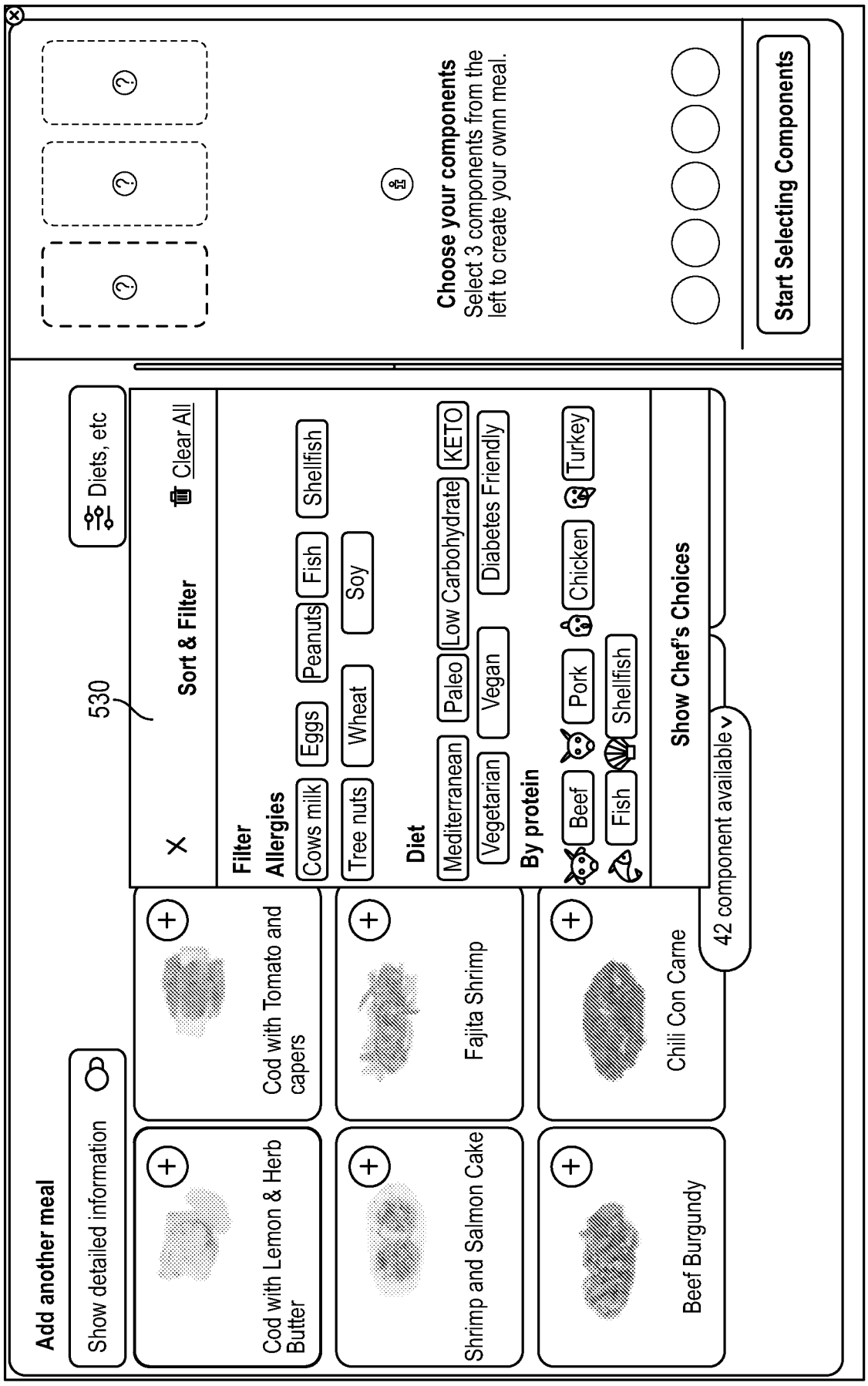
Add another meal
Show detailed information
Diets, etc
530
Sort & Filter
Clear All
Filter
Allergies
Cows milk
Eggs
Peanuts
Fish
Shellfish
Tree nuts
Wheat
Soy
Diet
Mediterranean
Paleo
Low Carbohydrate
KETO
Vegetarian
Vegan
Diabetes Friendly
By protein
Beef
Pork
Chicken
Turkey
Fish
Shellfish
Show Chef's Choices
42 component available
Cod with Lemon & Herb Butter
Cod with Tomato and capers
Shrimp and Salmon Cake
Fajita Shrimp
Beef Burgundy
Chili Con Carne
Choose your components
Select 3 components from the left to create your ownn meal.
Start Selecting Components

FIG. 17

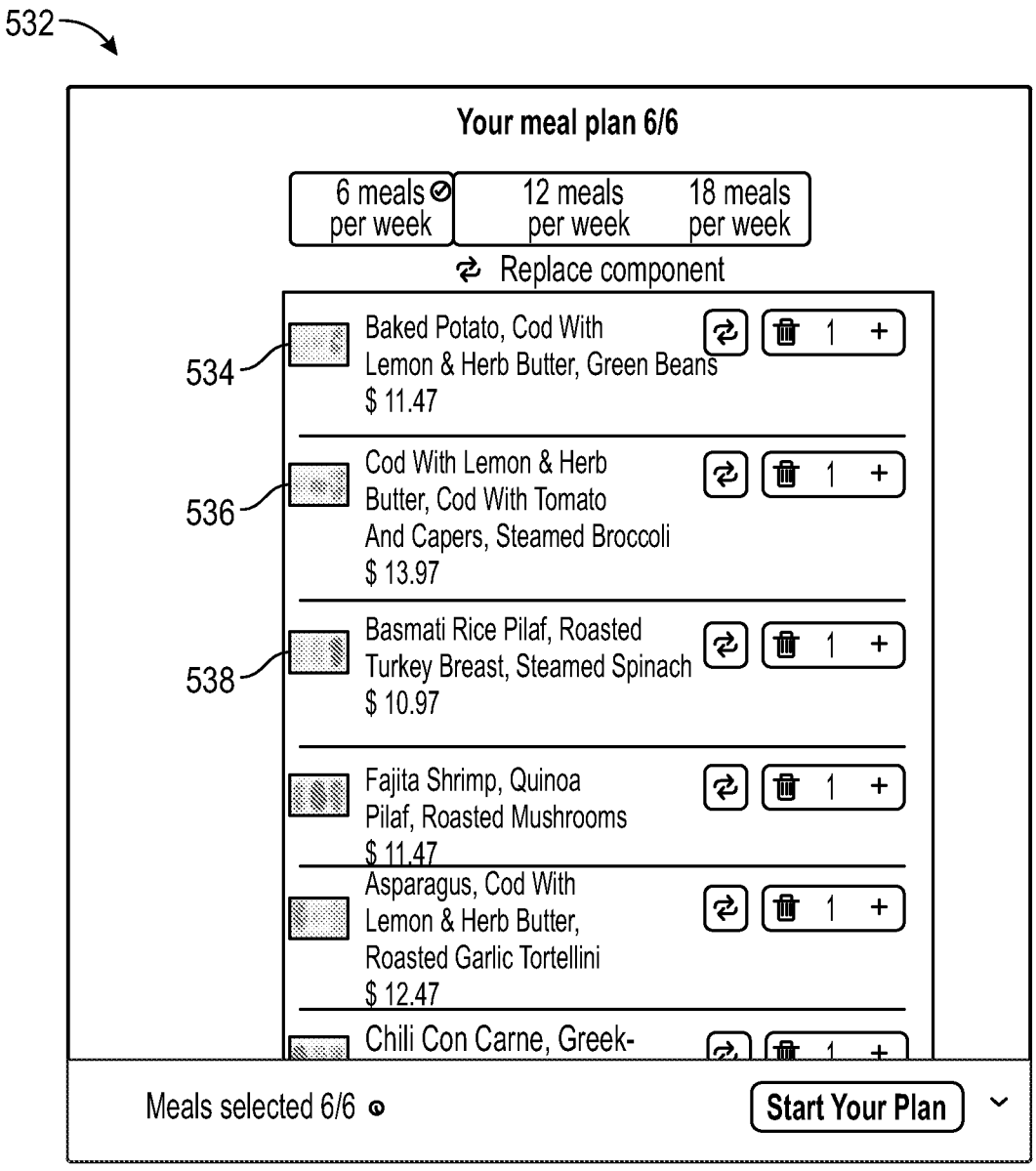
532
Your meal plan 6/6
6 meals per week
12 meals per week
18 meals per week
Replace component
534
Baked Potato, Cod With Lemon & Herb Butter, Green Beans
$ 11.47
536
Cod With Lemon & Herb Butter, Cod With Tomato And Capers, Steamed Broccoli
$ 13.97
538
Basmati Rice Pilaf, Roasted Turkey Breast, Steamed Spinach
$ 10.97
Fajita Shrimp, Quinoa Pilaf, Roasted Mushrooms
$ 11.47
Asparagus, Cod With Lemon & Herb Butter, Roasted Garlic Tortellini
$ 12.47
Chili Con Carne, Greek-
Meals selected 6/6
Start Your Plan

FIG. 18

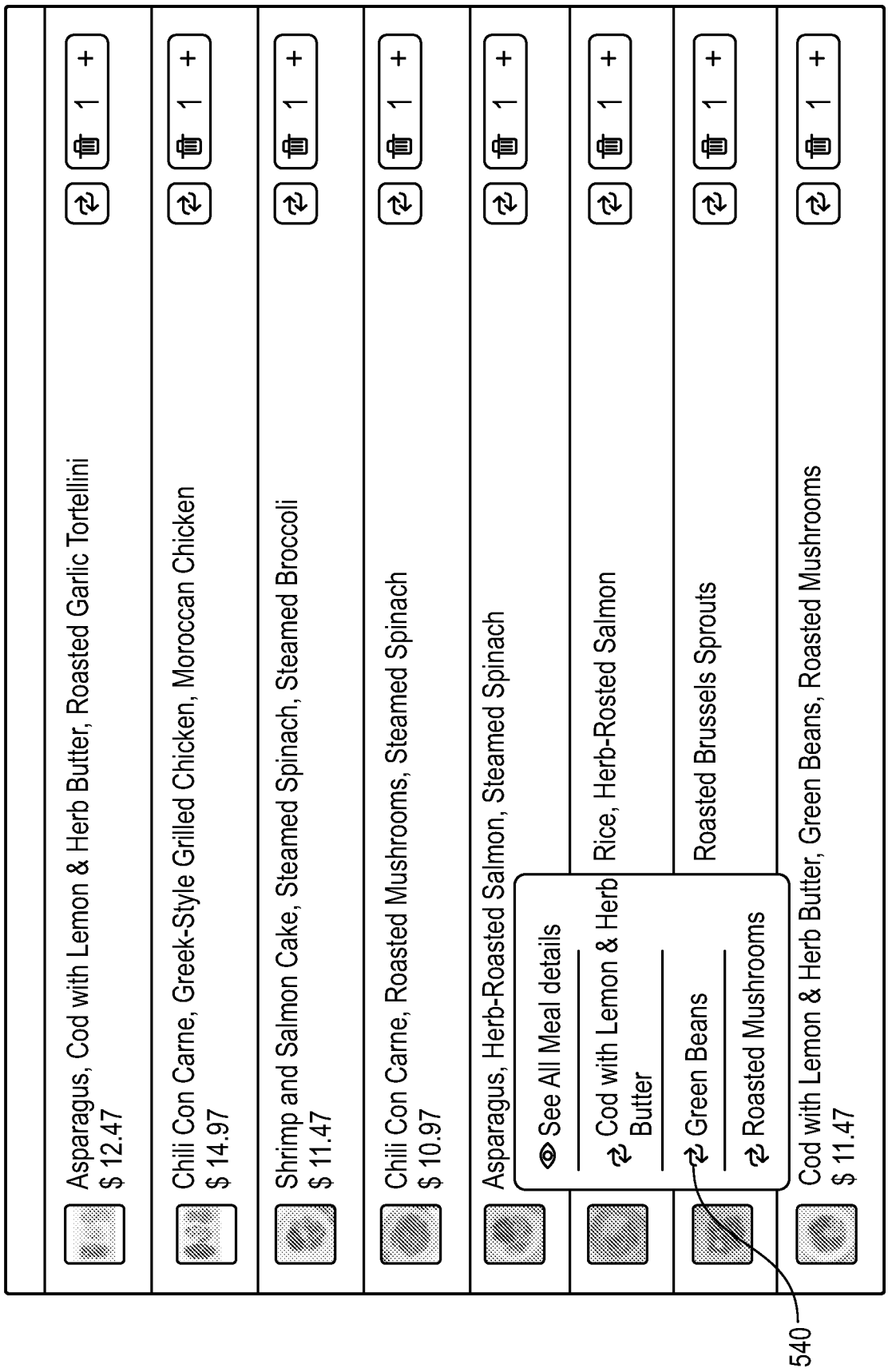
Asparagus, Cod with Lemon & Herb Butter, Roasted Garlic Tortellini
$ 12.47
Chili Con Carne, Greek-Style Grilled Chicken, Moroccan Chicken
$ 14.97
Shrimp and Salmon Cake, Steamed Spinach, Steamed Broccoli
$ 11.47
Chili Con Carne, Roasted Mushrooms, Steamed Spinach
$ 10.97
Asparagus, Herb-Roasted Salmon, Steamed Spinach
See All Meal details
Cod with Lemon & Herb Butter
Green Beans
Roasted Mushrooms
Rice, Herb-Rosted Salmon
Roasted Brussels Sprouts
Cod with Lemon & Herb Butter, Green Beans, Roasted Mushrooms
$ 11.47
540

FIG. 19

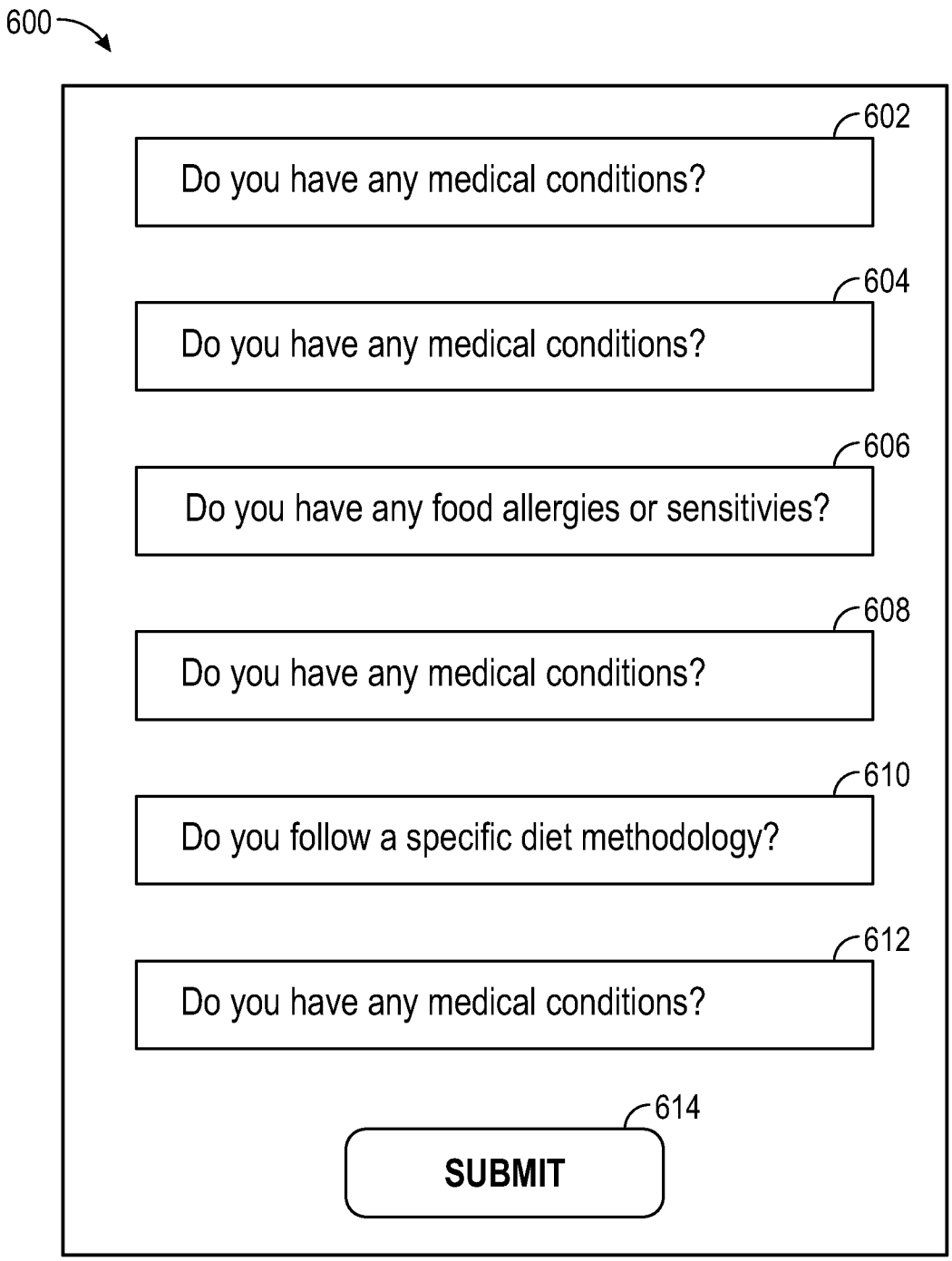
600
602
Do you have any medical conditions?
604
Do you have any medical conditions?
606
Do you have any food allergies or sensitivies?
608
Do you have any medical conditions?
610
Do you follow a specific diet methodology?
612
Do you have any medical conditions?
614
SUBMIT

FIG. 20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 23/68077

A. CLASSIFICATION OF SUBJECT MATTER

IPC - INV. A47J 47/14, B65D 21/00, B65D 77/00, B65D 1/24 (2023.01)
ADD. B65D 21/02 (2023.01)

CPC - INV. A47J 47/14, B65D 21/00, B65D 77/00, B65D 1/24

ADD. B65D 21/0235

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)
See Search History document

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/0017655 A1 (Martel et al.) 24 January 2008 (24.01.2008) entire document especially Abstract, para [0010]-[0020], para [0039]-[0050], para [0106]-[0120]	1-18, 39-47
Y	US 2017/0069225 A1 (Fitly Inc.) 09 March 2017 (09.03.2017) entire document especially Abstract, para [0003], para [0008]-[0015], para [0034]-[0042], para [0047]-[0052], para [0113]-[0120]	1-18, 39-47
Y	US 2017/0115045 A1 (Aiken) 27 April 2017 (27.04.2017) entire document especially Abstract, para [0005], para [0011]-[0012], para [0073]-[0088], FIG. 5A	19-38
Y	US 2016/0054049 A1 (Harvie) 25 February 2016 (25.02.2016) entire document especially Abstract, para [0001], para [0003]-[0009], para [0056]-[0063], para [0069]-[0074]	19-38
A	US 2020/0399019 A1 (The Stack - N - Go, LLC) 24 December 2020 (24.12.2020) entire document	1-47

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"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	Date of mailing of the international search report
13 October 2023	NOV 06 2023
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Kari Rodriquez Telephone No. PCT Helpdesk: 571-272-4300

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 23/68077

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
This application contains the following inventions or groups of inventions that are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I: Claims 1-18 and 39-47 directed to a meal packaging system/method comprising a plurality of food containers to fit within container compartments, receive food/meal selection data, a computing device that generates based on the food/meal selection data, a food/meal selection scheme that comprises instructions to place/load the first and second of the food containers within first and second of the container compartments.

-- see extra sheet--

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2023/064068

Continued from Box No. III Observations where unity of invention is lacking

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-26, 29-44 and 73, is drawn to a treatment system for destroying at least one of a perfluoroalkyl and polyfluoroalkyl substance (PFAS) contained in an influent fluid stream, the system comprising: an electrochemical (EC) reactor comprising at least one pair of electrodes including an anode electrode and a cathode electrode.

Group II, claims 27 and 28, is drawn to a treatment system for destroying at least one of a perfluoroalkyl and polyfluoroalkyl substance (PFAS) contained in an influent fluid stream, the system comprising: an effluent line configured to remove an effluent fluid stream comprising a portion of the recirculating fluid stream from the flow recirculation system along the effluent line.

Group III, claims 45 and 46, is drawn to a treatment system for destroying at least one of a perfluoroalkyl and polyfluoroalkyl substance (PFAS) contained in an influent fluid stream, the system comprising: an exhaust management system in fluid communication with the flow recirculation system and including a circuit through which an exhaust gas stream flows.

Group IV, claims 47-54, is drawn to a treatment system for destroying at least one of a perfluoroalkyl and polyfluoroalkyl substance (PFAS) contained in an influent fluid stream, the system comprising: an exhaust management system in fluid communication with the flow recirculation system and including a circuit through which an exhaust gas stream flows.

Group V, claims 55-72, is drawn to a method of destroying at least one of a perfluoroalkyl and polyfluoroalkyl substance (PFAS) contained in an influent fluid stream, the method comprising: flowing the influent fluid stream into a treatment system at an average influent rate.

The inventions listed as Groups I, II, III, IV, or V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: an electrochemical (EC) reactor comprising at least one pair of electrodes including an anode electrode and a cathode electrode, the EC reactor configured to switch between a first operational mode and a second operational mode, wherein when the EC reactor is in the first operational mode, a current generated between the anode electrode and the cathode electrode destroys at least some of the PFAS in the recirculating fluid stream as the recirculating fluid stream flows through the EC reactor, a foam management system comprising at least one overhead nozzle positioned vertically over a center region of the EC reactor and configured to dispense a portion of the recirculating fluid stream vertically downward toward the EC reactor to reduce an amount of foam in a container of the EC reactor, a chemical management system comprising at least one injector and at least one sensor in communication with the injector, wherein the at least one injector is configured to inject a chemical into the recirculating fluid stream based at least in part upon a signal received from the at least one sensor, a temperature control system comprising a chiller and configured to regulate a temperature of the recirculating fluid stream, and a recirculation pump configured to pump the recirculating fluid stream through the flow recirculation system; and an effluent pump configured to pump an effluent fluid stream comprising a portion of the recirculating fluid stream out of the flow recirculation system along an effluent line as claimed therein is not present in the invention of Groups II, III, IV, or V. The special technical feature of the Group II invention: an effluent line configured to remove an effluent fluid stream comprising a portion of the recirculating fluid stream from the flow recirculation system along the effluent line as claimed therein is not present in the invention of Groups I, III, IV, or V. The special technical feature of the Group III invention: an exhaust management system in fluid communication with the flow recirculation system and including a circuit through which an exhaust gas stream flows as claimed therein is not present in the invention of Groups I, II, IV, or V. The special technical feature of the Group IV invention: the EC reactor is disposed in a container configured to be transported from a first location to a second location as claimed therein is not present in the invention of Groups I, II, III, or V. The special technical feature of the Group V invention: the method comprising: flowing the influent fluid stream into a treatment system at an average influent rate; flowing a recirculating fluid stream through a recirculation system having an electrochemical (EC) reactor configured to destroy at least some of the PFAS in the recirculating fluid stream as the recirculating fluid stream flows through the EC reactor at an average recirculation rate; and removing an effluent fluid stream comprising a portion of the recirculating fluid stream from the recirculation system at an average effluent rate as claimed therein is not present in the invention of Groups I, II, III, or IV.

Groups I, II, III, IV, and V lack unity of invention because even though the inventions of these groups require the technical feature of a treatment system for destroying at least one of a perfluoroalkyl and polyfluoroalkyl substance (PFAS) contained in an influent fluid stream, the system comprising: a flow recirculation system including a fluid circuit through which a recirculating fluid stream flows, the flow recirculation system comprising, an electrochemical (EC) reactor configured to destroy at least some of the PFAS in the recirculating fluid stream as the recirculating fluid stream flows through the EC reactor, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 2019/0185352 to AECOM (DELAWARE CORPORATION) teaches a treatment system for destroying at least one of a perfluoroalkyl and polyfluoroalkyl substance (PFAS) contained in an influent fluid stream, the system comprising: a flow recirculation system including a fluid circuit through which a recirculating fluid stream flows, the flow recirculation system comprising, an electrochemical (EC) reactor configured to destroy at least some of the PFAS in the recirculating fluid stream as the recirculating fluid stream flows through the EC reactor (Paras. [0013-0018]).

Since none of the special technical features of the Group I, II, III, IV or V inventions are found in more than one of the inventions, unity of invention is lacking.