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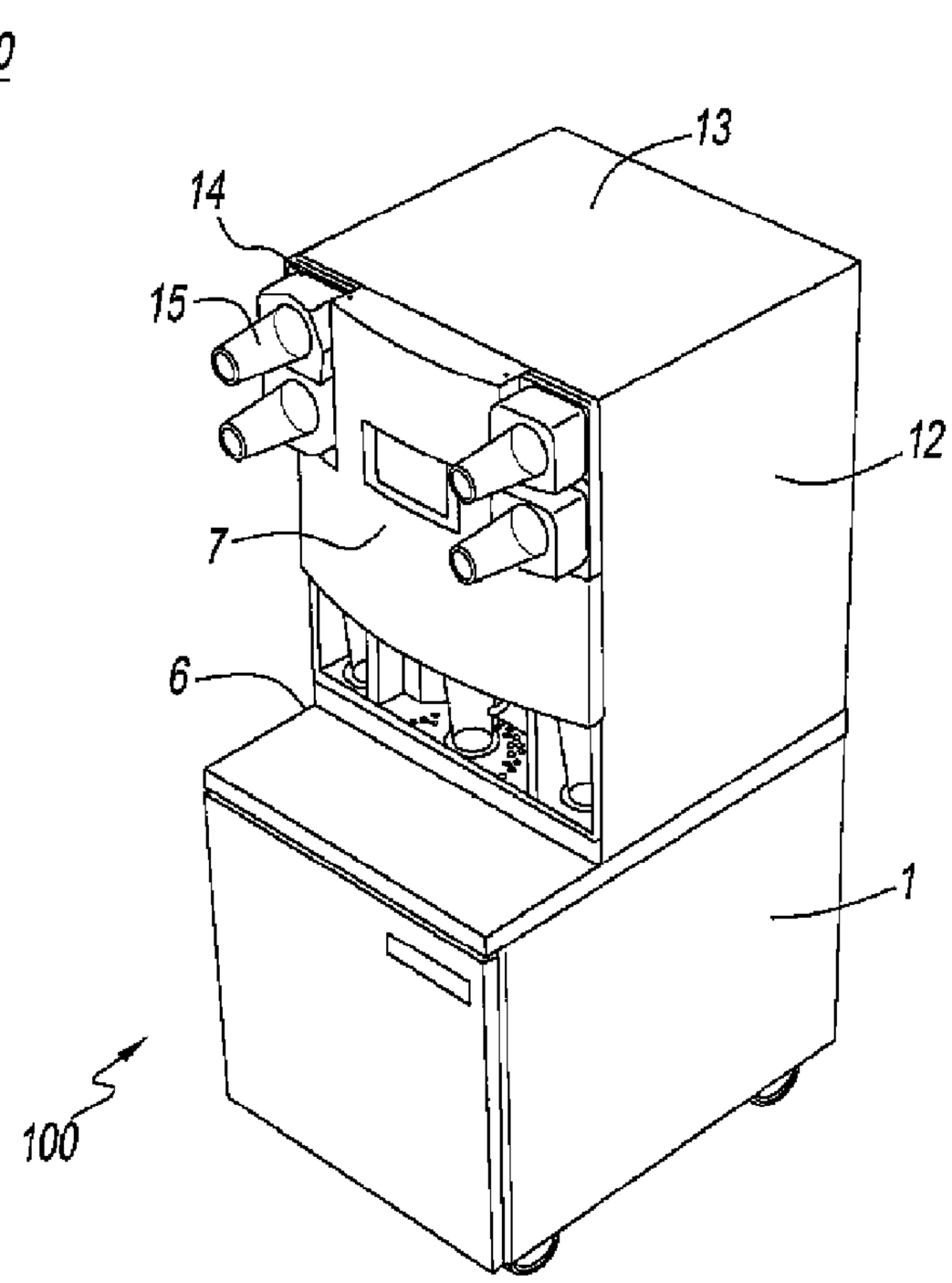
(72) **Inventeurs/Inventors:**
CLAESSON, JAN, US;
SMITH, WILLIAM E., US;
NEVAREZ, ROBERTO, US

(73) **Propriétaire/Owner:**
ENODIS CORPORATION, US

(74) **Agent:** SIM & MCBURNEY

(54) **Titre : DISPOSITIF ET PROCEDE DE CREATION D'UNE RECETTE DE BOISSON POUR UN SYSTEME INTEGRE POUR DISTRIBUER ET MELANGER/PREPARER DES INGREDIENTS DE BOISSON**

(54) **Title: A DEVICE AND METHOD OF CREATING A BEVERAGE RECIPE FOR AN INTEGRATED SYSTEM FOR DISPENSING AND BLENDING/MIXING BEVERAGE INGREDIENTS**



(57) **Abrégé/Abstract:**
A method and device for creating a beverage recipe for an integrated beverage blending system includes a dispenser and at least one blending/mixing/cleaning module. The method creates the beverage recipe with recipe program running on a computer

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(57) **Abrégé(suite)/Abstract(continued):**
interactively with a user making recipe entry parameters for the dispensing, blending and mixing operations. The recipe can be stored on a portable memory and inserted into a user interface controller of the integrated system or into an associated point of sale device.

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(71) Applicant *(for all designated States except US)*: **ENODIS CORPORATION** [US/US]; 2227 Welbilt Boulevard, New Port Richey, FL 34655 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **CLAESSON, Jan** [SE/US]; 4930 Patagonia Place, Land-o-lakes, FL 34638 (US). **SMITH, William, E.** [US/US]; 4103 Marlow Loop, Land-o-lakes, FL 34639 (US). **NEVAREZ, Roberto** [US/US]; 15915 Adobe Drive, Hudson, FL 34667 (US).

(74) Agent: **GREELEY, Paul, D.**; Ohlandt, Greeley, Ruggiero & Perle, L.L.P., One Landmark Square, 10th Floor, Stamford, CT 06901-2682 (US).

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(54) Title: A DEVICE AND METHOD OF CREATING A BEVERAGE RECIPE FOR AN INTEGRATED SYSTEM FOR DISPENSING AND BLENDING/MIXING BEVERAGE INGREDIENTS

(57) Abstract: A method and device for creating a beverage recipe for an integrated beverage blending system includes a dispenser and at least one blending/mixing/cleaning module. The method creates the beverage recipe with recipe program running on a computer interactively with a user making recipe entry parameters for the dispensing, blending and mixing operations. The recipe can be stored on a portable memory and inserted into a user interface controller of the integrated system or into an associated point of sale device.

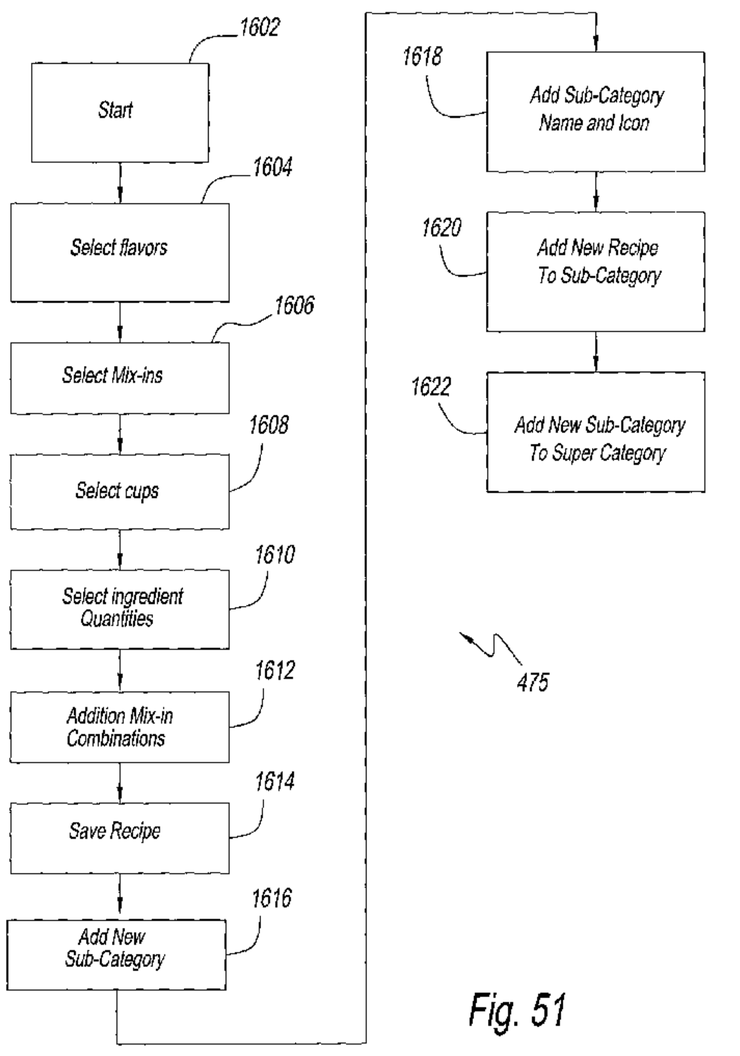

Fig. 51

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A DEVICE AND METHOD OF CREATING A BEVERAGE RECIPE FOR AN INTEGRATED SYSTEM FOR DISPENSING AND BLENDING/MIXING BEVERAGE INGREDIENTS

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present disclosure relates generally to a device and method for creating a beverage recipe for an integrated system for dispensing and blending/mixing beverage flavor/ingredients, thereby producing a beverage, e.g., a smoothie. More particularly, the present disclosure relates to a computer and method for creating a beverage recipe interactively with a user interface device. The integrated assembly includes a flavor/ingredient dispensing module, an ice making and portion control module, and a blender/mixer/cleaner module which is capable of dispensing all primary flavor/ingredients and, optionally, portioning and dispensing onboard manufactured ice into a single serving cup; blending and/or mixing such flavor/ingredients and ice to form a pre-selected beverage; and cleaning the blender shaft, blade and mixing compartment post mixing to avoid flavor contamination and to satisfy health and sanitary regulations.

2. Description of Related Art

[0002] Multiple steps are involved in creating a beverage or drink, for example, a smoothie drink, from beginning to end, and potential issues can occur at all stages. Smoothie making requires the use of blender pots to create the drink, meaning that the operator is required to purchase, maintain, and then store small wares (blender pots). Limitations of current technology also require the labor intensive transportation of ice to the smoothie machine from a separate icemaking machine in order to maintain a level of usable ice in the smoothie machine. This ice transfer is an issue

for many reasons. First, labor is required to transport the ice typically from a back storage room to the point of sale (POS) counter area of a restaurant, where the smoothie machines are typically located. This ice transfer can create a safety hazard for employees who could slip and fall on wet floors or injure themselves by improperly carrying a heavy bucket. It can also increase the likelihood of ice contamination through mishandling.

[0003] Once the ice is stocked, the employee must manually add an estimated amount to the blender pot. Since the amount of ice is not measured, but rather "guesstimated" by each employee, this ingredient is not precise and, therefore, makes it difficult to create the same franchised drink time after time.

[0004] After the ice is manually added, the juice and any additional fruit or flavor "mix-in" is added by the operator as well. Finally, a size of cup is chosen, and the drink is poured. This last step presents the largest chance for waste. Since the employee must portion the ingredients by hand, any overspill of the drink is left in the blender pot. At each step during this manual process, portion control is compromised, and money is potentially wasted on excess ingredients.

[0005] Once the order is complete and the customer has his or her drink, there is one last step to finalize the process—the method of manually cleaning the blender pot after each use to prevent the transfer of flavors and germs. Often, to save time, the blender pots are rinsed in a sink, which can compromise sanitation. While this might seem insignificant, flavor contamination can be a serious threat if customers have food allergies. Another drawback to the washing process is that it involves a substantial amount of time and labor on the part of the operator.

[0006] Each step in this process to create a smoothie takes time, typically four to five minutes, and that time could be better spent serving customers

or taking more food and beverage orders, directly contributing to the bottom line.

[0007] Although premium beverages such as smoothies are growing in popularity, most quick-service restaurants (QSRs) are unable to offer customers these options due to the time limitations of the quick-serve world. Those QSR owners that do opt to serve smoothies are confronted with a common set of challenges—mainly how to sell the same franchised drink time after time with existing labor and equipment limitations.

[0008] Accordingly, it has been determined by the present disclosure, there is a need for an assembly that dispenses and mixes beverage flavors/ingredients with ice in one integrated system, and thereafter self cleans for immediate reuse without subsequent flavor contamination. It has been further determined by the present disclosure, there is a need for an assembly for dispensing ice that uniformly dispenses ice. It has been further determined by the present disclosure, there is an additional need for an assembly for mixing a beverage which is capable of automatically rinsing/cleaning/sanitizing the blender housing, blender shaft and blender blade. It has been further determined that there is a need for device and method for creating beverage recipes for the integrated system.

SUMMARY

[0009] A method of the present disclosure operates a computer interactively with a user interface device to prepare a beverage recipe for an integrated beverage system that comprises a dispensing module that dispenses one or more selected ingredients into a beverage container and a blending/mixing module that blends and/or mixes the ingredients in the beverage container. The method comprises executing on the computer a recipe program, which presents one or more screens on a display of the user interface device for the user to enter recipe parameters for the beverage recipe, and which saves the entered recipe parameters as the beverage recipe in a memory associated with the computer.

[0010] In another embodiment of the method of the present disclosure, the memory is a portable memory.

[0011] In another embodiment of the method of the present disclosure, the computer is selected from the group consisting of: a user interface controller of the integrated beverage system, a point of sale device, and a computer that is independent of the integrated beverage system.

[0012] In another embodiment of the method of the present disclosure, the method further comprises putting the entered recipe parameters in an executable format for execution by at least one controller of the integrated beverage system that is in communication with the dispensing module and/or the blending/mixing module.

[0013] In another embodiment of the method of the present disclosure, the entered recipe parameters comprise one or more mixin combinations that comprise pre-dispense, pre-blend and pre-mix.

[0014] In another embodiment of the method of the present disclosure, the entered parameters comprise a name for the beverage recipe.

[0015] In another embodiment of the method of the present disclosure, the method further comprises placing the beverage recipe in a category of recipes.

[0016] In another embodiment of the method of the present disclosure, the entered recipe parameters comprise one or more of beverage flavors, ingredients, ice, water, container size, blending profile and mixing profile.

[0017] In another embodiment of the method of the present disclosure, the blending profile comprises a blending speed of a mixing element and a dwell time of the mixing element in the beverage container.

[0018] In another embodiment of the method of the present disclosure, the blending profile further comprises first and second blending speeds at first and second levels in the beverage container, respectively, and first and second dwell times for the mixing element at the first and second levels, respectively.

[0019] In another embodiment of the method of the present disclosure, the mixing profile comprises a mixing speed of a mixing element and a dwell time of the mixing element in the beverage container.

[0020] In another embodiment of the method of the present disclosure, the mixing profile comprises first and second mixing speeds at first and second levels in the beverage container, respectively, and first and second dwell times for the mixing element at the first and second levels, respectively.

[0021] In an embodiment of the computer of the present disclosure, the computer operates interactively with a user interface device to prepare a beverage recipe for an integrated beverage system that comprises a dispensing module that dispenses one or more selected ingredients into a beverage container and a blending/mixing module that blends and/or mixes the ingredients in the beverage container. The computer comprises a recipe program that when executed presents one or more screens on a display of the user interface device for the user to enter recipe parameters for the beverage recipe, and saves the entered recipe parameters as the beverage recipe in a memory associated with the computer.

[0022] In another embodiment of the computer of the present disclosure, the memory is a portable memory.

[0023] In another embodiment of the computer of the present disclosure, the computer is selected from the group consisting of: a user interface

controller of the integrated beverage system, a point of sale device, and a computer that is independent of the integrated beverage system.

[0024] In another embodiment of the computer of the present disclosure, the recipe program further comprises putting the entered recipe parameters in an executable format for execution by one or more controllers of the integrated beverage system that are in communication with the dispensing module and/or the blending/mixing module.

[0025] In another embodiment of the computer of the present disclosure, the entered recipe parameters comprise one or more mixin combinations that comprise pre-dispense, pre-blend and pre-mix.

[0026] In another embodiment of the computer of the present disclosure, the entered parameters comprise a name for the beverage recipe.

[0027] In another embodiment of the computer of the present disclosure, the recipe program further comprises placing the beverage recipe in a category of recipes.

[0028] In another embodiment of the computer of the present disclosure, the entered recipe parameters comprise one or more of beverage flavors, ingredients, ice, water, container size, blending profile and mixing profile.

[0029] In another embodiment of the computer of the present disclosure, the blending profile comprises a blending speed of a mixing element and a dwell time of the mixing element in the beverage container.

[0030] In another embodiment of the computer of the present disclosure, the blending profile further comprises first and second blending speeds at first and second levels in the beverage container, respectively, and first and second dwell times for the mixing element at the first and second levels, respectively.

[0031] In another embodiment of the computer of the present disclosure, the mixing profile comprises a mixing speed of a mixing element and a dwell time of the mixing element in the beverage container.

[0032] In another embodiment of the computer of the present disclosure, the mixing profile further comprises first and second mixing speeds at first and second levels in the beverage container, respectively, and first and second dwell times for the mixing element at the first and second levels, respectively.

[0033] In an embodiment of the memory media of the present disclosure, the memory media has stored thereon a recipe program for execution by a computer that operates interactively with a user interface device to prepare a beverage recipe for an integrated beverage system that comprises a dispensing module that dispenses one or more selected ingredients into a beverage container and a blending/mixing module that blends and/or mixes the ingredients in the beverage container. The memory media comprises instructions when executed cause the computer to present one or more screens on a display of the user interface device for the user to enter recipe parameters for the beverage recipe and to save the entered recipe parameters as the beverage recipe in a memory associated with the computer.

[0034] In another embodiment of the memory media of the present disclosure, the memory is a portable memory.

[0035] In another embodiment of the memory media of the present disclosure, the computer is selected from the group consisting of: a user interface controller of the integrated beverage system, a point of sale device, and a computer that is independent of the integrated beverage system.

[0036] In another embodiment of the memory media of the present disclosure, the further cause putting the entered recipe parameters in an executable format for execution by one or more controllers of the integrated beverage system that are in communication with the dispensing module and/or the blending/mixing module.

[0037] In another embodiment of the memory media of the present disclosure, the entered recipe parameters comprise one or more mixin combinations that comprise pre-dispense, pre-blend and pre-mix.

[0038] In another embodiment of the memory media of the present disclosure, the entered parameters comprise a name for the beverage recipe.

[0039] In another embodiment of the memory media of the present disclosure, the instructions further cause placing the beverage recipe in a category of recipes.

[0040] In another embodiment of the memory media of the present disclosure, the entered recipe parameters comprise one or more of beverage flavors, ingredients, ice, water, container size, blending profile and mixing profile.

[0041] In another embodiment of the memory media of the present disclosure, the blending profile comprises a blending speed of a mixing element and a dwell time of the mixing element in the beverage container.

[0042] In another embodiment of the memory media of the present disclosure, the blending profile further comprises first and second blending speeds at first and second levels in the beverage container, respectively, and first and second dwell times for the mixing element at the first and second levels, respectively.

[0043] In another embodiment of the memory media of the present disclosure, the mixing profile comprises a mixing speed of a mixing element and a dwell time of the mixing element in the beverage container.

[0044] In another embodiment of the memory media of the present disclosure, the mixing profile further comprises first and second mixing speeds at first and second levels in the beverage container, respectively, and first and second dwell times for the mixing element at the first and second levels, respectively.

[0044a] In another embodiment there is provided a method of operating a computer interactively with a user interface device to prepare a beverage recipe for an integrated beverage system that comprises a dispensing module that dispenses one or more selected ingredients into a beverage container and a blending/mixing module that performs one or both of a blending operation and a mixing operation to stir said ingredients in said beverage container, said method comprising: with said user interface device and said computer: preparing a beverage by: selecting a beverage recipe from a menu of beverage recipes; and operating said dispensing module and said blending/mixing module to prepare a beverage according to said beverage recipe with ingredients selected from a menu of beverage recipes to stir said selected ingredients in said beverage container; creating a new beverage recipe according to a recipe program stored in memory of the computer and that when executed by the computer comprises: presenting to a user one or more screens on a display of said user interface device for said user to enter one or more ingredients with recipe parameters for said new beverage recipe; and saving said entered ingredients with recipe parameters as said new beverage recipe in said menu library, wherein said recipe parameters comprise an ice quantity and one or more of a container size, a water quantity, a flavor quantity and a mixing quantity, and wherein said new beverage recipe is selectable by said step of preparing said beverage.

[0044b] In another embodiment there is provided an integrated beverage system comprising: a dispensing module that dispenses one or more selected ingredients into a beverage container; a blending and/or mixing module that performs one or both of a blending operation and a mixing operation to stir said ingredients in said beverage container; a computer that interacts with a user interface device (a) to operate said dispensing module and said blending/mixing module to prepare a beverage according to a beverage recipe with ingredients selected from a menu library of beverage recipes to stir said selected ingredients in said beverage container, and (b) to create a new beverage recipe according to a recipe program that when executed comprises: presenting to a user one or more screens on a display of said user interface device for a user to enter one or more ingredients with recipe parameters for said new beverage recipe; and saving said entered ingredients with recipe parameters as said new beverage recipe in said menu library, wherein said recipe parameters comprise an ice quantity and one or more of a container size, a water quantity, a flavor quantity and a mixing quantity, and wherein said new beverage recipe is selectable by said user interface device to operate said dispensing module and said blending/mixing module to prepare a beverage in said beverage container.

[0044c] In another embodiment there is provided non-transitory computer readable medium having stored thereon programmable instructions comprising at least a recipe program for execution by a computer that operates interactively with a user interface device to prepare a beverage recipe for an integrated beverage system that comprises a dispensing module that dispenses one or more selected ingredients into a beverage container and a blending/mixing module that performs one or both of a blending operation and a mixing operation to stir said ingredients in said beverage container, the programmable instructions executable by the computer to interact with said user interface device to perform the steps of: preparing a beverage by: selecting a beverage recipe from said menu library of beverage recipes; and operating said dispensing module and said blending/mixing module to prepare a beverage according

to said selected beverage recipe with ingredients, which are stirred in said beverage container; creating a new beverage recipe by: presenting to a user one or more screens on a display of said user interface device for said user to enter ingredients with recipe parameters for said new beverage recipe; and saving said entered ingredients with recipe parameters as said new beverage recipe in said menu library of beverage recipes, wherein said recipe parameters comprise an ice quantity and one or more of a container size, a water quantity, a flavor quantity and a mixing quantity, and wherein said new beverage recipe is selectable by said selecting step.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045] FIG. 1 is a front perspective view of an exemplary embodiment of a system that dispenses and mixes beverages according to the present disclosure;

[0046] FIG. 2 is a side view of the assembly that dispenses and mixes beverages of FIG. 1;

[0047] FIG. 3 is a front view of the assembly that dispenses and mixes beverages of FIG. 1;

[0048] FIG. 4 is a top view of the assembly that dispenses and mixes beverages of FIG. 1;

[0049] FIG. 5 is an exploded view of the assembly that dispenses and mixes beverages of FIG. 1;

[0050] FIG. 6 is a top front left-side perspective view of the system of the present disclosure wherein the front left-side portion has been cut away to depict each of the ice making and portioning module, and dispensing module.

[0051] FIG. 7 is a partial front cross-sectional view of the integrated ice maker bin and portion control assembly, dispensing nozzle and pair of oppositely disposed mixer/cleaning modules according to the present disclosure;

[0052] FIG. 8 is a front perspective view of an ingredient dispensing module according to the present disclosure;

[0053] FIG. 9 is a side view of the ingredient dispensing module of FIG. 8;

[0054] FIG. 10 is a front view of the ingredient dispensing module of FIG. 8;

[0055] FIG. 11 is a top view of the ingredient dispensing module of FIG. 8;

[0056] FIG. 12 is an exploded view of the ingredient dispensing module of FIG. 13;

[0057] FIG. 13 is a front perspective view of an ingredient dispensing module according to the present disclosure;

[0058] FIG. 13a is a connection apparatus for use with the ingredient dispensing module of Fig. 13;

[0059] FIG. 14 is a front perspective view of an flavor/ingredient dispensing module according to the present disclosure;

[0060] FIG. 15 is a top front side perspective view of a ice chute and ingredient dispensing nozzle according to the present disclosure;

[0061] FIG. 16 is a cross-sectional view of the nozzle of Fig. 15 along line 16-16;

[0062] FIG. 17 is a top front right side perspective view of a ingredient dispensing cassette with a support bar according to the present disclosure;

[0063] FIG. 18 is a top front right side perspective view of an ice dispensing module according to the present disclosure, wherein the ice portion control assembly has been removed therefrom and shown in an exploded view;

[0064] FIG. 19 is top left side perspective view of an ice bin, rake and portion control assembly according to the present disclosure;

[0065] FIG. 20 is a top front perspective view of the rake and portion control assembly of Fig. 19;

[0066] FIG. 21 is a top front perspective view of an ice leveler and bottom plate components of the portion control assembly of Fig. 20;

[0067] FIG. 22 is a bottom front perspective view of the rake and portion control assembly of Fig. 19;

[0068] FIG. 23 is a top front right side perspective view of a blender/mixer/cleaning module according to the present disclosure;

[0069] FIG. 24 is a side view of the blender/mixer/cleaning module of FIG. 23;

[0070] FIG. 25 is a front view of the blender/mixer/cleaning module of FIG. 23;

[0071] FIG. 26 is a top view of the blender/mixer/cleaning module of FIG. 23;

[0072] FIG. 27 is an exploded view of the blender/mixer/cleaning module of FIG. 23;

[0073] FIG. 28 is a front right side perspective view of the blender/mixer/cleaning module according to the present disclosure with a serving cup disposed therein, the blending blade in the retracted position and the door in the closed position;

[0074] FIG. 29 is front right side perspective view of the blender/mixer/cleaning module of Fig. 28, wherein the door has been removed from the module;

[0075] FIG. 30 is a back right side perspective view of a pair of blender/mixer/cleaning modules according to another embodiment of the present disclosure with associated cleaner storage receptacles;

[0076] FIG. 31 is a right side view of the blender/mixer/cleaning housing unit according to Fig. 28 with a cleaner snorkel dispensing member;

[0077] FIG. 32 is a right side view of the entire blender/mixer/cleaning module according to Fig. 28 without the cleaner snorkel dispensing member;

[0078] FIG. 33 is a bottom front perspective view of a blender blade according to the present disclosure;

[0079] FIG. 34 is a bottom front perspective view of the serving cup lock and seal lid used in the blender/mixer/cleaning module of Fig. 28;

[0080] FIG. 35 is a top right side perspective view of the combination serving cup holder and cleaner dispensing unit with the cleaner snorkel dispensing member according to the present disclosure;

[0081] FIG. 36 is a front planar view of an exemplary embodiment of the system according to the present disclosure;

[0082] FIG. 37 is a block diagram of an exemplary embodiment of a system controller according to the present disclosure;

[0083] FIG. 38 is a block diagram of the network gateway, front panel display controller, blender/mixer and cleaner module controller and ice making and portion controller according to the present disclosure;

[0084] FIG. 39 is a process flow diagram of an exemplary embodiment of a method for dispensing, blending/mixing and cleaning according to the present disclosure;

[0085] FIG. 40 is a listing of controller steps for selecting ingredients/flavors, additives and serving cup size according to the present disclosure;

[0086] FIG. 41 is a listing of controller steps for dispensing ingredients into a pre-selected serving cup size, selecting which blending/mixer module is to be activated and activating the selected blender according to the present disclosure;

[0087] FIGS. 42a and b are a listing of controller steps and displays for a system setup mode according to the present disclosure;

[0088] FIG. 43 is a block diagram of a user interface controller of the system controller of FIG. 38;

[0089] FIG. 44 is a block diagram of a blending controller of the system controller of FIG. 38;

[0090] FIG. 45 is a block diagram of a relay controller of the system controller of FIG. 38;

[0091] FIG. 46 is a block diagram of the control panel of system of FIG. 36:

[0092] FIG. 47 is a flow diagram for the system controller of FIG. 37;

[0093] FIG. 48 is a flow diagram of the dispensing program of the relay controller of Fig. 45;

[0094] FIG. 49 is a flow diagram of the blending program of the blending controller of Fig. 44;

[0095] FIG. 50 is a flow diagram of the cleaning program of the blending controller of Fig. 44;

[0096] FIG. 51 is a flow diagram of the recipe program of the user interface controller of FIG. 43; and

[0097] FIGS. 52-63 are user interactive display screens presented by the user interface controller of FIG. 38.

DETAILED DESCRIPTION OF THE INVENTION

[0098] Referring to the drawings and in particular to FIGS. 1-5, an exemplary embodiment of an assembly that dispenses and mixes beverages ("assembly"), according to the present disclosure is generally referred to by reference numeral 100. Assembly 100 makes ice, dispenses flavors/ingredients and ice into a serving cup 15, and then blends or mixes to form a beverage. One such beverage, for example, is a smoothie that preferably includes a flavor ingredient and ice mixed together. Assembly 100 has an onboard ice maker, ice storage and portion control module 300, a flavor/ingredient dispensing module 1100, and a blender/mixer/cleaning module 303. Assembly 100 shows ice maker, ice storage and portion control module 300, flavor/ingredient dispensing module 1100, and blender/mixer/cleaning module 303 as one integrated assembly. It is contemplated by the present disclosure that one or more of ice maker, ice

storage and portion control module 300, flavor/ingredient dispensing module 1100, and blender/mixer/cleaning module 303 may be separate from assembly 100, however, it is preferable that they are all integrated into a single assembly 100. That is, vertical placement of ice maker, ice storage and portion control module 300, flavor/ingredient dispensing module 1100, and blender/mixer/cleaning module 303 reduces a size of assembly 100 and its associated flooring footprint in comparison to three separate and distinct machines.

[0099] Assembly 100 has a housing that includes a lower wall 6, an upper wall 7, side walls 11 and 12, and a top wall 13. Lower wall 6 has a container holder portion 20. The housing connects cup supports 4 and 5 that secure cup holders 14 to assembly 100. Cup holders 14 removably hold cups 15 therein. Cup 15 may be disposable or reusable single serving cups. If cup 15 is disposable, such as, for example, paper or plastic cups, the beverage dispensed and mixed within cup 15 may be served directly to a customer eliminating the step of pouring the beverage into a serving cup and eliminating labor needed to wash an additional container. Cup 15 may be any size, such as, for example, about 8 ounces to about 32 ounces.

[00100] Figures 6 and 7 provide an overview of the integrated assembly 100 according to the present disclosure, wherein assembly 100 comprises: flavor/ingredient dispensing module 301, ice maker, ice storage and portion control module 300 and a pair of blender/mixer/cleaning modules 303 disposed on opposite sides of dispensing nozzle 304. Ice maker, ice storage and portion control module 300 includes an ice maker 305. Ice maker 305 may be any ice maker, and, preferably an ice maker that forms flakes of ice. For example, ice maker 305 may include an ice making head of cylindrical configuration in which a water container that is filled with water from a water source has at least one refrigerated wall forming a freezing chamber cooled by a flow of refrigerant gas, and a motor driven scraper which continuously breaks up ice forming on the refrigerated surface into ice flakes. The refrigerant gas may be cooled by a

refrigeration cycle, such as, for example, a vapor compression cycle that includes a compressor, condenser, expansion valve, and evaporator. One or more of the compressor, condenser, expansion valve, and evaporator may be integral with assembly 100 or remote from the rest of assembly 100. For example, compressors may create undesirable noise and may be remotely located from the rest of assembly 100. Ice maker 305 may include an axially-extending auger or auger assembly that is rotatably disposed within the freezing chamber and generally includes a central body portion with one or more generally spirally-extending flight portions thereon disposed in the space between the central body portion and the refrigerated wall in order to rotatably scrape ice particles from the cylindrical freezing chamber. A drive means assembly rotatably drives the auger such that when make-up water is introduced into the freezing chamber through a suitable water inlet and frozen therein, the rotating auger forcibly urges quantities of ice particles through the freezing chamber to be discharged through an ice outlet end.

[00101] Nugget ice may be made from the flakes by passing the flakes of ice through an extruder head where a nugget shape is formed. Nugget ice is different from cube style ice in that the nugget is not homogenous but is multiple flakes of ice compressed into a nugget. Nugget ice is softer ice (easier to chew) that requires less power to mix into a beverage. Ice maker, ice storage and portion control module 300 is shown as mounted as an integral part of assembly 100 but can be located remotely and ice mechanically transported to assembly 100. The nuggets of ice are pushed through the extruder head and this force can be used to transport the ice to assembly 100, which may allow for larger ice output. Ice maker 305 reduces an overall sound level and allows for operation near a front counter or drive-through window without impacting communications. The use of nugget ice also allows the operator to use a single serving cup for dispensing, blending and serving the consumer because the stress of blending cubed ice is reduced.

[00102] Referring to FIGS. 8-17, flavor/ingredient dispensing module 1100 is shown. Referring to FIG. 12, flavor/ingredient dispensing module 1100 has a refrigerated housing 1110. Refrigerated housing 1110 includes a refrigeration cycle, such as, for example, a vapor compression cycle that includes a compressor, condenser, expansion valve, and evaporator. One or more of the compressor, condenser, expansion valve, and evaporator may be integral with flavor/ingredient dispensing module 1100 or remote from the rest of flavor/ingredient dispensing module 1100. For example, compressors may create undesirable noise and may be remotely located from the rest of assembly 100.

[00103] Refrigerated housing 1110 cools one or more holders or cassettes 1115. Holders 1115 each hold a flexible container via a hanging rod 1117 (see FIG. 17, such as, for example, a bag, that contains an ingredient for the beverage. The bag may be a 2.5 gallon bag. The ingredient may be a flavored liquid or mix. The ingredient is cooled while stored in holders 1115 by refrigerated housing 1110 having a door 1111 and wheels 1113. Each of holder has a connection aperture 1117 with a gap 1118 (see FIG. 13a) for allowing substantially all of the flavor/ingredient disposed in container 1115 to be removed without concern regarding the collapsing of the bag (not shown). Connection aperture 1117 of each of holders 1115 is connected to a conduit 1119 that passes through a base 1120. As shown in FIG. 13, conduit 1119 may connect to a pump rack 1123. Pump rack 1123 has one or more pumps 1125 that selectively move a portion of the ingredient from the bag/container in holders 1115 through connection aperture 1117, to conduit 1119, to a line conduit 1130, and to dispenser nozzle 304 to dispense the ingredient out of assembly 100, for example, to cup 15. The ice and the ingredient are dispensed into cup 15 but are segregated from each other until dispensed into cup 15 to prevent contamination. There is an ingredient dispense tube for each ingredient in each of holders 1115 and one ice nozzle in nozzle 304. See FIGS. 15 and 16 for a view of nozzle 304 formed by injection molding of a plastic material to provide an ice chute conduit 1126 centrally disposed

within nozzle 304 and a plurality of flavor/ingredient dispensing apparatus 1127

[00104] As shown in FIG. 14, conduit 1119 may connect to a pump 1125. Pump 1125 selectively moves a portion of the ingredient from the container in holders 1115 through connection aperture 1117, to conduit 1119, to a line conduit 1130, and to dispenser nozzle 304 to dispense the ingredient out of assembly 100, for example, to cup 15. Pump 1125 may be an air powered pump that may include a diaphragm.

[00105] A portion of the ingredient, such as, for example, a fruit base, may be controlled by time. A controller maintains accuracy by determining an amount of the fruit base that has been delivered from the container in holder 1115. As a fluid level decreases within the container within holder 1115, the controller allocates a longer delivery time to compensate for a decrease in head pressure within the container within holder 1115. Pump 1125 may be positive displacement and a controller controls the pumps on a time basis. The time can be adjusted to control portion accuracy. Assembly 100 may only dispense ice from ice maker, ice storage and portion control module 300 into cup 15 and not an ingredient from flavor/ingredient dispensing module 1100.

[00106] As shown in FIGS. 18-22, ice maker, ice storage and portion control module 300 has one or more portion cups 302 that are fillable with ice. Portion cups 302 are formed by apertures 310 through a top plate 312. Plate 312 may have a circular shape. Each of apertures 310 has a sidewall that extends from top plate 312. Top plate 312 is positioned on a bottom plate 313 so that the sidewall of each aperture 310 abuts bottom plate 313 forming an interior volume for each of portion cups 302. Portion cups 302 have a predetermined size to hold a predetermined volume of ice. Portion cups 302 may be any size, such as, for example, about 1 ounce. Bottom plate 313 has a dispensing aperture 323 that is aligned with a nozzle 304.

As shown in FIG. 7, dispenser nozzle 304 extends through a top side of container holder portion 20.

[00107] Top plate 312 is connected to a drive assembly 301 by a connector bar 314 to rotate portion cups 302. Drive assembly 301 may be, for example, a gear drive motor. Portion cups 302 that are filled with ice rotate with connector bar 314 on bottom plate 313 while bottom plate 313 remains stationary. Each of portion cups 302 remains filled with ice on bottom plate 313 until the portion cup passes over the dispenser aperture in bottom plate 313. The ice in the portion cup passes through the dispenser aperture in bottom plate 313 to dispenser nozzle 304 that dispenses the ice out of assembly 100, for example, into cup 15. Water is removed from cups 302 via perforated holes 321 disposed in bottom plate 313.

[00108] Connector bar 314 connects to drive assembly 301 through a sensor 306. Connector bar 314 may include a cam or one or more protrusions 328 that fit within sensor 306 to form a cam follower and micro-switch for counting the number of portion cups 302 which dispense ice via dispensing aperture 323. Connector bar 314 may be connected to stirrer bars 320 and 322. Bars 320 and 322 are ice agitators that rotate through the ice in a storage bin 305a shown in FIG. 6 of ice dispenser 305. Their purpose is to keep the nugget ice from clumping together which would prevent the ice from filling into the ice cups.

[00109] The ice from ice dispenser 305 fills cups 302. Ice dispensing assembly 300 controls an amount of ice dispensed out of assembly 100 by controlling an amount of portion cups 302 that pass over a dispenser nozzle 304. Portion cups 302, for example, are round and hold a predetermined amount of ice. The number of portion cups 304 that pass over dispenser nozzle 304 determine the size of the drink being prepared. Portion cups 302 hold the predetermined amount of ice in the interior volume and as the size of the volume of ice increases or decreases a

number of portion cups 302 that pass over dispenser nozzle 304 increases or decreases based on the predetermined amount of ice needed for each beverage. The cam follower and micro-switch are used to count a number of portion cups 302 that pass over dispenser nozzle 304. Counting a number of portion cups 302 that pass over dispenser nozzle 304 prevents positioning one of portion cups 302 partially over dispenser nozzle 304. A weight of the ice in storage bin 305a of ice dispenser 305 causes the ice cups to fill. As the assembly rotates the ice is leveled by a wedge 303 to provide accurate portioning. Portion control wedge 303 closes off a top of portion cups 302 as they pass towards a dispense chute above dispenser nozzle 304 after being filled with ice, thereby ensuring that a consistent portion of ice is present in each cup 302 before is releases its content into dispense chute 1126 disposed within nozzle 304. Wedge 303 may be a sheet metal wedge with a top portion 316, a side portion 318, and a bottom portion (not shown) that surround top plate 312 and bottom plate 313.

[00110] FIGS. 23-35 depict a, blender/mixer/cleaning module 303 of assembly 100. It is contemplated that assembly 100 may include, for example, from one blender/mixer/cleaning module up to six or more blender/mixer/cleaning modules. More than one blender/mixer/cleaning module 303 allows for creation of a second beverage while mixing a first beverage, contributing to higher beverage output by assembly 100.

[00111] As shown in FIG. 27, blender/mixer/cleaning module 303 has a mixer housing 205. Mixer housing 205 has a first side wall 210, a second side wall 215, a back wall 217, a top wall 220, and a bottom wall 225 forming an interior volume 230. Interior volume 230 may be enclosed by a door 235 that moves to a closed position when in blending, mixing or cleaning mode, shown in FIGS. 7 and 28, and an open position uncovering interior volume 230 when blender/mixer/cleaning module 303 is in a load or unload mode. Optionally, door 235 may be a material that is transparent or translucent so that interior volume 230 is visible when door 235 is in the closed position. Door 235 is removable for maintenance as shown in FIG.

29. Bottom wall 225 may have a drain aperture 227. Drain aperture 227 may be covered by a filter cover 229.

[00112] Mixer housing 205 is optionally supported on a support structure 237. Support structure 237 has a motor support 239 that extends therefrom. Motor support 239 is connected to a motor 240. Motor 240 may be a stepper motor 241a with a linear slide 241 that is connected to motor support 239. Motor 240 is connected to a mixer 245. Motor 240 may be connected to mixer 245 by a bracket 247 that is moved by motor 240. Motor 240 moves spindle shaft 260 of mixer 245 in a reciprocal vertical movement through top wall 220 into or out of interior volume 230.

[00113] Mixer 245 may be connected to a lid assembly 250, as shown in FIG. 34. Lid assembly 250 has a lid 252 and a plurality of alignment rods 254. Lid 252 is complementary in shape to a container, for example, a cup 15 having liquid therein placed within interior volume 230. Lid assembly 250 may move with mixer 245 into interior volume 230 into contact with cup 15. Lid assembly 250 remains in contact with cup 15, once lid assembly 250 is in contact with cup 15 while mixer 245 may move further into interior volume 230 along a length of connection rods 254. Spindle shaft 260 does not engage or spin until lid assembly 250 is in contact with cup 15 to prevent and spray or splatter. When mixer 245 is retracted toward top wall 220, mixer 245 moves along the length of alignment rods 254 until an end of alignment rods 254 is reached and then lid assembly 250 moves with mixer 245.

[00114] Mixer 245 has a spindle assembly 242 having a blender blade 255 that is wider than a spindle shaft 260. Blender blade 255 has projections that facilitate mixing of liquid within the cup 15. Spindle shaft 260 connects to a mixer motor 265 that spins blender blade 255 and spindle shaft 260.

[00115] Mixer 245 may be attached to linear slide 241 so that linear slide 241 moves mixer 245 vertically. A controller provides a mixing profile that insures proper mixing of the beverage. Linear slide 241 is driven by the stepper motor 241a that provides precise control of movement of linear slide 241. The controller may move lid assembly 250 (blender carriage) until lid 252 touches the rim of cup 15 before mixer 245 is energized to spin blender blade 255. By moving blender blade 255 about 25% into the liquid within cup 15 before mixer 245 is energized to spin blender blade 255, splatter from mixer 245 energizing before entering into the beverage is reduced and/or eliminated. After blender blade 255 is energized a customizable program indexes blender blade 255 down into cup 15. Blender blade 255 may be energized with a customizable program that indexes blender blade 255 down into cup 15 to insure that the nugget ice has a particle size that is reduced to beverage specifications defined by the user. Blender blade 255 dwells at a bottom of cup 215 for a predetermined amount of time. Blender blade 255 is raised and lowered for a predetermined period of time to provide complete blending of components of the beverage. After mixing is complete spindle assembly 242 returns to a home position, as shown in FIGS. 7 and 28. Stepper motor 240a and linear slide 240 may have a controller that counts a number of steps that motor travels allowing precise location of blender blade 255 leading to uniform beverages each time a beverage is dispensed and mixed from assembly 100. Preferably, blender blade 255 is an emulsifying blade as shown in FIG. 33.

[00116] Door 235 may have a safety switch 236. Microswitches are located on mixer housing 205. When door 235 is raised a microswitch 211, as shown in FIG. 27, is switched and blender blade 255 is disengaged from cup 15 retracting to it off position. Additionally, there is a tab 267, as shown in FIG. 32, that is a door interlock on mixer 245 that prevents door 235 from being opened when blender blade 255 is lowered.

[00117] Referring to FIG. 32, back wall 217 may have a container or cup holder or guide 270 connected thereto. Holder 270 may hold cup 15 in position during mixing by mixer 245. Holder 270 may be shaped complimentary to the shape of cup 15, for example, a U-shape.

[00118] Holder 270 may also be connected to a liquid source (not shown) by tubing 275. Tubing 275 may be connected to the liquid source through a solenoid 280. The liquid is dispensed through one or more apertures 272 (shown in FIG. 27) in holder 270 into interior volume 230. The liquid may be water and/or a sanitizer. The water and/or sanitizer drains through drain aperture 227. FIG. 30 depicts a pair of sanitizer supply vessels 281 connected via tubes or conduits 283 to tubes 275, respectively. Preferably, a rinse or cleaning snorkel 286, as shown in FIGS. 31 and 35, is in fluid communication with holder 270 so that cleaning fluid may be dispensed substantially near the top of interior volume 230 of mixer housing 205.

[00119] After cup 15 is removed from interior volume 230, door 235 may be moved to a closed position so that interior volume 230 and/or mixer 245 may be rinsed/cleaned and/or sanitized. Water solenoid 280 and air solenoid 220a (FIG. 24) are energized. Mixer 245 is energized spinning blender blade 255 and lowered into interior volume 230 by stepper motor 241a and linear slide 241. Blender blade 255 is indexed up and down causing rinse liquid to spray entire interior volume 230 or mix compartment. Mixer 245 is de-energized stopping blender blade 255 from spinning and returns to the home location. Air continues and is used to help in removal of water residue. Another cup having another beverage therein may be mixed by mixer 245.

[00120] Mixer 245 and interior volume 230 may be rinsed with water only after mixing each beverage, mixer 245 and interior volume 230 may be rinsed with water and/or sanitized with a sanitizing liquid, such as, for example, soap or detergent, after mixing each beverage, or mixer 245 and

interior volume 230 may be rinsed with water only after mixing each beverage and periodically mixer 245 and interior volume 230 are sanitized. A "Y" fitting 284 (see FIG. 30) may be placed into a water line 275 upstream of solenoid 280 to connect a source of sanitizing liquid 281. The sanitizing liquid may be metered into the water to sanitize mixer 245 and interior volume 230. The amount of sanitizing liquid may be controlled by a flow restriction (not shown) in tubing 283 of the source of sanitizing liquid 281 that connects to the "Y" fitting 284. A solenoid valve may be connected to tubing 283 of the source of sanitizing liquid 281 that connects to the "Y" fitting 284. The solenoid valve may be controlled so as to provide water only to rinse mixer 245 and interior volume 230 after mixing each beverage, and to periodically (e.g., daily) add the sanitizing liquid with the water to sanitize rinse mixer 245 and interior volume 230. Interior volume 230 and/or mixer 245 being rinsed and/or sanitized as described herein after each use prevents flavor transfer, eliminates germs, and eliminates the need for manual washing.

[00121] Referring to FIG. 7, in use, cup 15 is placed on container holder portion 20 of assembly 100. Ice maker, ice storage and portion control module 300 dispenses ice to cup 15 through nozzle 304 and ingredient dispenser assembly 1100 dispenses an ingredient, such as, for example, a fruit base to cup 15 through nozzle 304. Cup 15 is then transferred into interior volume 230 of blender/mixer/cleaning module 303. Door 235 is moved to the closed position and mixer 245 mixes the ice and fruit base. Upon completion of the mixing, door 235 is moved to the opened position and cup 15 is removed and delivered to the consumer. Door 235 is then closed and interior volume 230 is rinsed and/or sanitized.

[00122] Each beverage may be mixed in a single serving cup 15 that is served directly to a consumer, allowing the entire beverage to be delivered to the consumer raising product yield and reducing wasted beverage, e.g., when blending the beverage in a blender pot. Having each

beverage blended in its own cup improves flavor control and reduces allergy issues caused through cross-contamination.

[00123] Referring to FIGS. 23, 24, 27 and 28, a controller 206, which, for example, may be disposed on a printed circuit board, controls blender/mixer/cleaning module 303. When the beverage is dispensed into the cup and placed in mixer housing 205, a microswitch, such as microswitch 211 in door 235, is switched indicating the presence of the cup. Controller 206 energizes stepper motor 241a on linear slide 241 or linear actuator and mixer 245 is lowered into the cup to a predetermined level (typically by counting a number of steps that stepper motor 241a is operated). When blender blade 255 reaches a pre-determined level controller 206 energizes stepper motor 241a to rotate blender blade 255. Blender blade 255 dwells at the pre-determined level for a time and then linear slide 241 is energized and is lowered further into the beverage to insure proper blending of the beverage. During the mixing blender blade 255 is raised and lowered in a sequence defined by the end user. Upon completion of the mixing process controller 206 disengages stepper motor 241a and energizes linear slide 241 to remove blender blade 255 from the beverage. The beverage is removed from the mix chamber or interior volume 230 and trips a door microswitch 236. Upon the switching of door microswitch 236 controller 206 begins the rinse process.

[00124] Referring to FIG. 37, a controller 400 comprises a structure of control or printed circuit boards 401, 402, 403, 404 and 405 identifying that they are separate but interconnected. This provides flexibility in the design allowing additional boards to be added without re-designing the entire controller of assembly 100. Printed circuit board 401 carries a user interface controller 412 (see FIG. 37) that incorporates a button panel, such as a control panel 500 shown in FIGS. 36 and 46, that an operator uses to select the drink as well as a computer that interconnects to other control boards. Printed circuit board 402 provides a gateway for communication to various methods (web, modem, USB, and the like). Printed circuit boards

403 and 404 carry blender controllers (for example, blender controller 206 in FIG. 38) for blending, mixing and cleaning activities of blending/mixing/cleaning module 303 and will house controllers for mixer spindle motor 240, linear slides 241, water solenoid 280 and air solenoid 220a. Printed circuit board 405 houses switching relays for ice maker, ice storage and portion control module 300, flavor/ingredient dispensing module 1100. C-bus 406 is a communication interconnect between printed circuit boards 401 and 402. A P-bus 407 is a wiring interconnect between printed circuit boards 401, 403, 404 and 405.

[00125] Controller 34 may optionally include a Point Of Sale (POS) device 408. POS device 408 may be connected to C-bus 406 as shown and provide user input to user interface controller circuit board 401 or could act as a server providing input via communications board 402 to controller 400. Alternatively, POS device 408 can provide a selection of a beverage, container size, ingredients and additives, which point to a matching script of a matching beverage in a menu library. The matching script is then conveyed to circuit boards 403, 404 and 405. The menu library could be located in POS device 408 or in user interface board 401.

[00126] An external computer 497 is shown, which may be any suitable remote computer such as, a personal computer (PC), server and the like. Computer 497 may be used to create recipes for the beverages that assembly 100 prepares and serves, to collect and to analyze run time data received from controller 400 via a network (not shown) and communications board 402. Computer 497 in one embodiment comprises a USB port that is shown with a memory stick 498. The created recipes for the beverages can be stored on memory stick 498, which can be removed and inserted into user interface controller 401 or POS device 408. A beverage selection made by a user can be used to retrieve a corresponding one of the beverage recipes from memory stick 498, which can be used to provide the scripts or program instructions for dispensing, blending and mixing to printed circuit boards 403, 404 and 405 via P-bus

407. In other embodiments, computer 497 can communicate with user interface controller 412 and/or POS device 408 via a network, communications board 406 and C-bus 406.

[00127] Referring to FIG. 38, controller 400 has inputs and outputs connected to assembly 100. A Network Gateway C modbus Communication module 410 allows communication via modem, Internet, and the like. Network gateway 410 includes a C-modbus feature 411 for communicating via C-bus 406. User interface controller 412 includes a Front Panel CCA User interface 414 that includes interfaces 416 and 418 to a Monochrome LCD display and a Membrane keyboard (KB) or a color LCD display with a touch screen and further includes a USB port 420 and a P/C modbus protocol feature for communicating via C-bus 406 with communications board 402 (Fig. 37) and via P-bus 407 with mixer boards 403 and 404 and smart relay board 405.

[00128] Controller 400 comprises a blender controller 206 for each blending/mixing/cleaning module 303 in assembly 100. As these blending controllers are identical, only one blending controller is shown in Fig. 38. Blender controller 206 comprises a cup present feature 424 that receives from blending/mixing/cleaning module 303 an input from sensor 211 that indicates the presence of cup 15. Blender controller 206 also comprises a safety door position feature 426 that receives an input from a sensor 236 that indicates a door up or door down position. Blender controller 206 further comprises a home detect feature 428 that receives an input from a sensor 422 that indicates spindle assembly 242 is in the home position. Sensor 422, for example is located just to the right of motor 265 in FIG. 28. Blender controller 206 further includes control logic for a micro stepping motor driver feature 430 that initiates or provides control signals to linear drive motor 241a of blender assembly 303. Blender controller 206 further includes control logic for an air solenoid driver feature 432 that provides an air pulse to pump 220a of blender assembly 303. Blender controller 206 further includes control logic for a water solenoid driver that provides a

control signal to water solenoid 280 of blender assembly 303. Blender controller 206 further includes control logic for a motor drive feature 436 that provides drive voltage/current to mixer motor 265 of blender assembly 303. Blender controller 206 also includes a P-modbus feature 433 for communicating with user interface controller board 401, mixer board 404 and system relay board 405 via P-bus 407. Blender controller 206 further includes a 1/24 VDC supply 429 that may be either internally derived from incoming AC power from a smart relay controller 435 or supplied from an external DC power supply.

[00129] Smart relay controller 435 handles control of refrigeration system 1110 with a syrup detection feature 436 that receives an input from a syrup bag loaded sensor 1140 (shown only in FIG. 38) of refrigeration system 1110. Smart relay controller 435 further includes control logic for a syrup solenoid driver feature 438 that provides a control signal to operate a selected flavor or syrup pump 1125 of refrigeration system 1110. Smart relay controller 435 further includes control logic for a water solenoid feature 440 that provides a control signal to operate water solenoid 1142 of refrigeration system 1110. Smart relay controller 435 further includes a syrup refrigeration temperature feature that receives an input from a temperature sensor 1144 of refrigeration system 1110.

[00130] Smart relay controller 435 further includes monitoring features of ice storage and portion control module 300 (hereafter sometimes referred to as ice handler module 300). Smart relay controller 435 includes an ice refrigerator temperature feature 444 that receives an input from an ice temperature sensor 340 (shown only in FIG. 38) of ice handler module 300. Smart relay controller 435 includes an ice volume (or bin) full temperature feature 446 that receives an input from an ice volume (or bin full) temperature sensor 342 of ice handler module 300. Smart relay controller 435 includes an ice volume (or bin) low temperature alarm feature 448 that receives an input from an ice low temperature sensor 344 of ice handler module 300. Smart relay controller 435 includes an ice

dispenser position feature 450 that receives an input from an ice position sensor 346 of ice handler module 300. Smart relay controller 435 further includes an ice dispenser control feature 454 that supplies AC power to drive assembly 301 of ice handler module 300. Smart relay controller 435 further includes an ice compressor hour gauge feature 456 that controls the application of AC power to a compressor 348 of ice handler module 300.

[00131] Smart relay controller 435 also includes an AC power interface 452 that receives an AC line voltage which is supplied to blender controller 206, refrigeration system 1110 and ice handler 300 as shown by the boldface lines in Fig. 38. Smart relay controller 435 further includes a 5/24 VDC supply that may be either internally derived from incoming AC power (by an AC to DC converter) or supplied from an external DC power supply.

[00132] Smart relay controller 435 also includes a P-modbus feature 437 for communicating with user interface board 401 and mixer boards 403 and 404 via P-bus 407. Smart relay controller 435 also includes a P/C-modbus feature 439 for communicating with user interface controller board 401 via P-bus 407. Smart relay controller 435 also includes a C-modbus feature 441 for communicating with network gateway 410.

[00133] Referring to FIG. 43, user interface controller 412 comprises a processor 460, a communication interface 462, an input/output (I/O) interface 464 and a memory 466 interconnected via a bus 468. Communication interface 462 is connected to C-bus 406 for communicating with servers via a network such as the Internet. For example, interface controller 412 may receive from an external server downloads of program changes, new programs, and/or various other commands, programs or data and may send to an external server various status data concerning operational data, maintenance data, and the like.

[00134] I/O interface 472 comprises connections to control panel 500 (FIGS. 36 and 38) and at least one UBS port 472 for connection to an external memory 474, which, for example, may be a memory stick, an external memory drive or other external memory. I/O interface 464 also comprises a connection to P-bus 407 for communications with blender controllers 206 and relay controller 435 .

[00135] Memory 466 comprises a master program 470 and a recipe program 475. Master program 470 is used to control of assembly 100 and various other programs, such as, an operating system, utility programs and other programs. In one embodiment, user interface controller 412 uses recipe program 475 to create beverage recipes. Processor 460 is operable to execute master program 470, recipe program 475 and the other programs as well. In an alternate embodiment, recipe program 475 can be executed by PC 497 for storage of the created beverage recipes on memory stick 498, which then can be used by user interface controller 412 or POS device 408 to retrieve for a selected beverage the corresponding beverage recipe for execution by controller 400. By way of example, the embodiment with recipe program 475 stored in memory 466 and executed by processor 460 will be described herein.

[00136] Referring to FIG. 44, blender controller 206 comprises a processor 476, an input/output (I/O) interface 478 and a memory 482 interconnected via a bus 480. I/O interface 478 includes connections to blender module 303 as shown in FIG. 38. I/O interface 478 comprises a connection to P-bus 407 for communications with user interface controller 412 and relay controller 435. Memory 482 comprises a blending program 484 and a cleaning program 486 for control of blender module 303 and various other programs, such as, an operating system, utility programs and other programs. Processor 476 is operable to execute blending program 484, cleaning program 486 and the other programs as well. Other blender controllers 206 in assembly 100 include an architecture identical to blender

controller 206 for control of associated blending/mixing/cleaning modules 303.

[00137] Referring to FIG. 45, relay controller 422 comprises a processor 488, an input/output (I/O) interface 490 and a memory 494 interconnected via a bus 492. I/O interface 490 includes connections to refrigeration module 1110 and ice handler module 300 as shown in FIG. 38. I/O interface 490 also includes a connection to P-bus 407 for communicating with interface controller 412 and blender controllers 206 of assembly 100 (FIGS. 37 and 38). I/O interface 490 also includes a connection to P-bus 407 for communicating with user interface controller 412 and blender controller 206. Memory 494 comprises a dispensing program 496 for control of refrigeration module 1110 and various other programs, such as, an operating system, utility programs and other programs. Processor 488 is operable to execute dispensing program 496 and the other programs as well.

[00138] Referring to FIG. 46, control panel 500 comprises a display 502 and a keypad 504. User interface controller 412 interacts with a user to present display screens on display 502 and responds to user entries made with keypad 504 or by touch, cursor voice or other input. Display 502 may be any suitable display and, preferably, is a Liquid Crystal Display (LCD). Keypad 504 may be any suitable keypad, keyboard or touch screen and, preferably is a touch screen.

[00139] In a preferred embodiment the display screens comprise the screens shown in FIGS. 48-69. It will be appreciated by those of skill in the art that other display screens can be used. Referring to FIG. 48, a display screen 1200 comprises three sections 1202, 1204 and 1206 that are used in each of the display screens of FIGS. 48-69 to display information to the user.

[00140] Controller 400 of the present disclosure will be described for a beverage assembly 100 as shown in FIG. 36, in which controller 400 comprises user interface controller 412, relay controller 435 and two blender controllers 206 for a right blending/mixing/cleaning module 303 and a left blending/mixing/cleaning module 303. Referring to FIG. 47, user interface controller 412 is executing master program 470. At steps 1300, 1302 and 1303, user interface controller 412 presents on display 502 a series of display screens (not shown) for the user to select a beverage (for example, a smoothie), a flavor (for example, strawberry), an additive type or mix-in A, B, C or D (for example, fruit, yogurt or other), and a cup size (for example, small medium or large). Dependent on the type of additives it can be added in different stages of drink making , which gives the drink different attributes dependent on where it is added. The user may select none of the additives or up to four of the additives.

[00141] At step 1306, master program 470 determines if additive A has been selected. If not, master program 470 advances to step 1310. If so, the user at step 1308 is prompted to place one or multiple additive type A into a cup, place the cup under the dispenser head or nozzle 304 and then activate an advance button (not shown). At step 1310 master program 470 responds to the user activation of the advance button at step 1306 or step 1308 to prepare a script that contains dispensing instruction data that comprises the selected flavor, additive (if any), and cup size. At step 1312, user interface controller 412 communicates this script to relay controller 435 via P-bus 407 (FIGS. 37 and 38).

[00142] Relay controller 435 at this time executes a dispensing program 496 (FIG. 70) based on the script received from user interface controller 412. When the dispensing program is finished, relay controller 435 sends a dispensing complete message via P-bus 407 to user interface controller 412. Master program 470 at step 1314 determines if additive B has been selected. If not, master program 470 advances to step 1318. If

so, the user at step 1316 is prompted to place one or more additive type B into the cup.

[00143] At this point, the user is prompted to place the cup in one of the two blending/mixing/cleaning modules 303. In this example, the user places the cup in the left mixer assembly 303. Master program 470 prepares a script for left controller 206 of left blender assembly 303. This script contains blending instruction data that comprises the cup size and the spindle speed and dwell time for each level of blending for the selected beverage and additives A and/or B (if any). User interface controller 412 communicates this script to left blender controller 206 via P-bus 407. At step 1320, left blender controller 206 for left blending/mixing/cleaning module 303 (FIGS. 36 and 37) executes a blending program 484 (FIG. 71) based on the drink #1 blending script or profile for blending the contents of the cup for drink #1.

[00144] Left blender controller 206 for left blending/mixing/cleaning module 303 senses the return of the spindle to the home position based on a signal from home sensor 422 (Fig. 38) or a door up or open position and sends a blending done message to user interface controller 412 via P-bus 407.

[00145] At step 1322, master program 470 determines if additive type C has been selected. If not, master program 470 advances to step 1328. If so, the user is prompted to remove the cup from left blending/mixing/cleaning module 303 and add one or more additive type C to the cup. In step 1326, the user is prompted to place the drink #1 cup in the left blending/mixing/cleaning module 303 and close the blender door. Master program 470 prepares the script for blending drink #1 with additive type C and sends it via P-bus 407 to left blender controller 206. Left blender controller 206 uses this script to execute step 1326 to blend the contents of drink #1 cup for a second blending.

[00146] The beverage recipe could alternatively require mixing instead of blending at this point. For this case, the script or profile for drink #1 includes a mixing instruction. Mixing chops up coarse ice particles into fine particles. On the other hand, blending blends the coarse particles without substantially changing the granularity. To accomplish mixing and/or blending blade 255 has a sharp side and a dull side. For a mixing operation, the spindle assembly is rotated in a direction win which the sharp side chops the coarse ice particles. For a blending operation, the spindle assembly is rotated in the opposite direction so the dull face of blade 255 stirs the ingredients without substantially changing the granularity of the ice particles.

[00147] When the second blending or mixing procedure is finished, left blending controller 206 sends a complete message via P-bus 407 to user interface controller 412. At step 1328, master program 470 determines if additive D (Topping) has been selected. If not, master program 470 advances to step 1340. If so, the user is prompted to remove the cup and from left blending, mixing/cleaning module 303 and add the topping to the beverage. At step 1340, the user is prompted to serve the beverage.

[00148] Master program 470 then waits for execution of a cleaning procedure 1342 (Fig. 47) by left blender controller 206, which will be described hereinafter. When the cleaning procedure is finished, master program 470 completes its execution for drink #1 at box 1344.

[00149] Referring to FIG. 70, a dispensing program 496 is stored in memory 494 and executed by processor 488 of relay controller 435 (FIG. 45) at step 1412 of master program 470 of FIG. 47. At step 1412, script is received from user interface controller 412 via P-bus 407. This script comprises a cup size, selected flavor(s), selected additive(s) and an ice amount. At step1420 dispensing program 496 calculates dispensing by dividing the total amount of ice (from the received script) by the size of the

portion cups 302 of FIGS. 18-20. For example, these amounts can be measured by volume or weight. In a preferred embodiment, the amounts are measured by weight. This calculation yields the number of portion cups 302 that need to be filled. At step 1422 relay controller 435 dispenses the ice to dispenser nozzle 304 via portion cups 302 with appropriate drive voltage to drive assembly 301.

[00150] At step 1414, the valve on-times are calculated based on the selected flavors contained in the received script. The valves are the valves that control air flow from a pressurized air source to air powered pumps 1125 of the selected flavor fluids. The on-time of the valve is calculated by multiplying the desired amount by the calibration dispense rate constant for that fluid and add the calibration lag time to achieve the total on-time. At step 1416 dispensing program 496 calculates delay times for starting the dispensing of the flavor fluids. The delay times for the fluid dispense time is there to avoid the situation of a lot of ice on top of the drink (since the ice dispense time is much longer than the fluid dispense). With a lot of ice on top of the drink, it is difficult to blend properly. The delay time is normally set as a portion of the ice dispense time with a typical value of 50%. At step 1418, the fluids are dispensed by operating the selected pumps after the calculated time delays and for the calculated times. At step 1424 the dispensing is completed and relay controller 435 sends a dispensing complete message to user interface controller 412 via P-bus 407.

[00151] Referring to FIG. 71, a blending program 484 is stored in memory 482 and executed by processor 476 of blending controller 206 (FIG. 44) at steps 1320 and 1326 of master program 470 of FIG. 47. At step 1427, script is received from user interface controller 412 via P-bus 407. This script comprises cup size, blending positions, initial blade speed, blade speed for each blending position, blend time for each blend position and reduced blade speed. At step 1428, blending program 484 determines if door 235 is closed. This is accomplished by checking the status of the door sensor 409 of the associated blending/mixing/cleaning module 303. If

the status is open or up, blending program 484 awaits detection of door 235 in a closed or down position. When the door 235 is closed, blending program 484 turns on spindle motor 265 to rotate spindle shaft 260 and blade 255 at the initial speed prescribed in the script.

[00152] At step 1430, blending program 484 uses micro stepping motor driver feature 430 to provide drive signals to operate micro stepping motor 241a and linear slide 241 to lower spindle shaft 260 and blade to a top blending position in the cup. At this point the rotational speed is changed from the initial speed to the top blend speed for the top blending position and maintained for the prescribed time according to the script. When blending for the prescribed time at the top blending position has expired, blending program 484 uses micro stepping motor driver feature 430 to provide drive signals to operate micro stepping motor 241a and linear slide 241 to lower spindle shaft 260 and blade 255 to a next blending position in the cup (e.g., near the bottom of the cup). At this point in step 1431 the rotational speed is changed from the top position blending speed to a bottom blend speed for the bottom blending position. Step 1432 maintains the bottom blend speed for the prescribed time according to the script.

[00153] When blending for the prescribed time at the bottom blending position has expired, blending program 484 at step 1433 uses micro stepping motor driver feature 430 to provide drive signals to operate micro stepping motor 241a and linear slide 241 to raise spindle shaft 260 and blade 255 to a next blending position in the cup (e.g., near the middle of the cup). At this point the rotational speed is changed from the bottom position blending speed to a middle blend speed for the middle blending position. Step 1432 maintains the blend speed for the prescribed time according to the script.

[00154] When blending for the prescribed time at the middle blending position has expired, blending program 484 at step 1435 uses micro

stepping motor driver feature 430 to provide drive signals to operate micro stepping motor 241a and linear slide 241 to raise spindle shaft 260 and blade 255 to the top of the cup and maintain the spindle speed. At step 1436 the spindle speed is reduced according to the script. At step 1437 blending program 484 uses micro stepping motor driver feature 430 to provide drive signals to operate micro stepping motor 241a and linear slide 241 to raise spindle shaft 260 and blade to the home position and turn of motor 265 to stop rotation of spindle shaft 260 and blade 255. At step 1438, blending program 484 determines if door 235 is open by checking the status of the door sensor 409 of the associated blending/mixing/cleaning module 303. If the status is closed or down, blending program 484 awaits detection of door 235 up or open position. When this occurs, blending program 484 at step 1439 awaits the next instruction or script from user interface controller 412.

[00155] Referring to Fig. 72, a cleaning program 486 is stored in memory 482 and executed by processor 476 of blending controller 206 (FIG. 44) at step 1342 of master program 470 of FIG. 47. At step 1441, script for cleaning is received from user interface controller 412 via P-bus 407. This script comprises spindle speed and predetermined vertical position. At step 1442, by cleaning program 486 determines if door 235 is closed. This is accomplished by checking the status of the door sensor 409 of the associated blending/mixing/cleaning module 303. If the status is open or up, blending program 484 awaits detection of door 235 closed or down position. When the door 235 is closed, blending program 486 turns on spindle motor 265 to rotate spindle shaft 260 and blade 255 at the spindle speed prescribed in the script. At step 1444, blending program 486 turns on the water spray by operating water solenoid 280 to provide water to holder 270 which emits a water spray via apertures 272 or snorkel 286 (FIGS. 31 and 35) into interior volume 230 of blending/mixing/cleaning module 303. At step 1445, blending program 486 moves the rotating spindle shaft 260 and blade 255 downward in interior volume 230, thereby dispersing the water spray to rinse a wide area of the wall and door of the

interior volume 230. When spindle shaft 260 and blade 255 reach the predetermined vertical position in interior volume 230, cleaning program 486 at step 1446 turns on air solenoid 220a to provide a blast of air pressure in interior volume 230. The air will also boost the water spray as well as blowing off excess water from the interior of the chamber in the spindle parts. An added benefit is that the air will enhance the evacuation of the drain and reduce the risk of clogging.

[00156] Cleaning program 486 at step 1447 waits one second and then moves spindle shaft 260 and blade 255 up a distance (e.g., about one inch) at step 1448. At step 1449, sir solenoid 220a is operated to turn off the air flow. At step 1450, spindle shaft 260 and blade 255 is returned to the home position. At step 1451, cleaning program 486 is finished and sends a cleaning complete message to user interface controller 412 via P-bus 407.

[00157] The recipe creating apparatus of the present disclosure will be described for creating recipes for a beverage assembly 100 as shown in FIG. 36, in which controller 400 comprises user interface controller 412, relay controller 435 and at least one of blender controllers 206 for a right blending/mixing/cleaning module 303 and/or a left blending/mixing/cleaning module 303. In the embodiment of FIG. 43, user processor 460 of interface controller 412 is executing recipe program 475. Referring to FIGS. 51 and 52, recipe program 475 begins at step 1602 by presenting a screen 1630 on display 502 (FIG. 46). The user selects a recipes tab 1632 which presents a box 1634 that shows a plurality of icons of recipes that are on hand. The user selects an add new recipe button 1636, which causes program 475 (FIG. 51) to advance to step 1604 to present on display 502 a screen 1638 (FIG. 53) for the user to select one or more flavors for the new recipe.

[00158] Screen 1638 includes a Flavors button 1639, a Mixins button 1641 and a Cups button 1643. A flavors box 1640, a mixins box 1642 and

a cups box 1644 are displayed adjacent Flavors button 1639, Mixins button 1641 and Cups button 1643, respectively. To select flavors, the user activates Flavors button 1639. Program 475 responds by displaying an Edit Flavors box 1646. Edit Flavors box 1646 includes a box 1648 that includes a list of flavors identified by icons. The user selects one or more flavors from this list by operation of keypad 504 or other entry device. In this example, the user selects the peach icon and the strawberry icon.

[00159] Recipe program 475 then advances to step 1606 that presents on display 502 a screen 1650 shown in FIG. 54 for the user to select mixins for the new recipe. The icons for selected flavors peach and strawberry are displayed in flavors box 1640. To select mixins the user activates Mixins button 1641. Program 475 responds by displaying an Edit Mixins box 1652. Edit Mixins box 1652 includes a box 1654 that includes a list of mixins identified by icons. The user selects one or more mixins from this list by operation of keypad 504 or other entry device. In this example, the user selects a banana puree icon (not shown in box 1654).

[00160] Recipe program 475 advances to step 1608 that presents on display 502 a screen 1656 shown in FIG. 55 for the user to select a cup size. An icon for the selected mixin banana puree is displayed in box 1642. To select cups, the user activates Cups button 1644. Program 475 responds by displaying an Edit Cups box 1658. Edit Cups box 1658 includes a box 1660 that includes a list of cup sizes shown as small, medium and large. The user selects a cup size from this list by operation of keypad 504 or other entry device. In this example, the user selects the medium size cup.

[00161] A select recipe icon screen 1662 shown in FIG. 56 is presented at this point or any other point in the series of display screens by recipe program 475. The selected cup size medium is now displayed in box 1644. To select an icon for the new recipe, the user activates a Recipe Image button 1664. Program 475 responds by displaying a Select Icon box

1666. Select Icon box 1666 includes a box 1668 that includes a plurality of icons. The user selects an icon from box 1668 by operation of keypad 504 or other entry device. In this example, the user selects an "Oreo" icon (not shown in box 1668).

[00162] Recipe program 475 advances to step 1610 that presents on display 502 a screen 1670 shown in FIG. 57 for the user to select ingredient quantities and a mixin combination. The selected "Oreo" icon is displayed at 1672. Icons for small, medium and large cup sizes are displayed in box 1644. That is, the new recipe "Oreo" can be made for the cup sizes small, medium and large. Screen 1670 is used to make entries that pertain to one of the cup sizes, which the user selects from boxes 1682, 1683, 1684 and 1685. For this example, the user has selected box 1682 for the small cup.

[00163] The recipe mixin combination is shown by a pre-dispense (PRE DIS) box 1674, a pre-blend (PRE BLEND) box 1675, a pre-mix (PRE MIX) box 1676 and a topping (TOPPING) box 1677. The mixin choices are provided by selecting the arrows in boxes 1674, 1675, 1676 and 1678, which causes a display of a list of the choices (not shown) for selection. Icons for the mixins (or additives) are displayed in mixins box 1642. The user enters the number of ingredient units for each selected mixin in boxes 1678, 1679, 1680 and 1681 located beneath pre-dispense box 1674, pre-blend box 1675, pre-mix box 1676 and topping box 1677, respectively. In this example, the user has entered "1" unit in each of mixin boxes 1678, 1679, 1680 and 1681.

[00164] The user has selected the strawberry flavor by activating a button 1688 in flavors box 1640. In this example, the user has entered "1" ounce in each of flavor boxes 1690, 1692 and 1694. The user enters a water quantity in ounces in a box 1696 and an ice quantity in ounces in a box 1698.

[00165] A blend profile box 1700 for blending operations of blending/mixing/cleaning module 303 includes a blade speed box 1702, a blade speed box 1704, a dwell time at bottom of the cup box 1706, a mix middle of cup box 1708 and a dwell time at middle of cup box 1710. The user has entered a blade speed of 100% in box 1702 (indicating a maximum speed), a blade speed of 50% in box 1704 (indicating a speed of 50% of maximum speed at the bottom of the cup), a dwell time of 2 seconds at the bottom of the cup box 1706, a distance of 2.5 inches (from the top of the cup) in mix middle box 1708, and a dwell time of 2 seconds in dwell at middle box 1710.

[00166] A mix profile box 1712 for mixing operations of blending/mixing/cleaning module 303 includes a blade speed box 1714, a blade speed box 17164, a dwell time at bottom of the cup box 1718, a mix middle of cup box 1720 and a dwell time at middle of cup box 1722. The user has entered a blade speed of 40% in box 1714 (indicating a speed of 40% of a maximum speed), a blade speed of 100% in box 1716 (indicating a maximum speed at the bottom of the cup), a dwell time of 2 seconds box 1718 at the bottom of the cup, a distance of 2.5 inches (from the top of the cup) box 1720, and a middle of cup dwell time of 2 seconds in box 1710. The user can save the recipe by activating a save the recipe button 1724.

[00167] Recipe program 475 advances to additional mix-in combinations step 1612 and presents on display 502 a screen 1736 shown in Fig. 58. In screen 1730 the user has entered 2 in a box 1732 to add another mix-in combination. This allows the user to add a second mixin combination, which has been entered as None, PRE-BLEND, PRE MIX and None in boxes 1647, 1675, 1676 and 1677, respectively. Screen 1730 also shows quantities for ingredients and mixins for a medium size cup that the user has entered. Another screen (not shown) identical to screens 1670 and 1730 is used to make entries for a large sized cup

[00168] Recipe program 475 advances to step 1614 and presents on display 502 a screen 1736 shown in FIG. 59 to save the recipe when completed by activating a save the recipe button 1724. Screen 1736 also includes a mixins combination box 1738, which lists the two selected mixin combinations.

[00169] Recipe program 475 advances to step 1616 and presents on display 502 a screen 1740 shown in FIG. 60 to add a new sub-category to the recipes. The user selects a sub-categories tab 1742, which displays a plurality of sub-categories in a box 1744. The user selects an add new category box 1746. Recipe program 475 responds by advancing to step 1618 and presents a screen 1750 shown in FIG. 61. Screen 1750 includes an edit sub-category box 1752, which includes a category name box 1754 in which the user has entered CATEGORY 1 and a box 1756 in which the name "new" has been entered. When complete, the user saves the category name and icon by selecting save a category button 1758.

[00170] Recipe program 475 advances to step 1620 and presents on display 502 a screen 1770 shown in FIG. 62 for adding recipe new to the sub-category. Screen 1770 includes a recipe list 1772 and a sub-category list 1774. The user selects recipe new from recipe list 1772 and adds it to sub-category list 1774. The user then activates a close button 1776.

[00171] Recipe program 475 then advances to step 1622 and presents on display 502 a screen 1780 shown in FIG. 63 for adding a new sub-category to a super category. Screen 1780 includes a super categories tab 1782. When the user selects tab 1782, a sub-categories list 1784 and a super category list 1786 are presented on screen 1780. The user selects category1 from sub-categories list 1784 and adds it to super category list 1786. The user then activates a close button 1776.

[00172] Recipe program 475 stores the recipes in memory 466 and/or external memory 474 of user interface controller 412 for the exemplary

embodiment. External memory 474 can be removed and installed on another integrated beverage blending system. In another embodiment, recipe program 475 is executed on PC 497 (FIG. 37) to create recipes that are stored on an external memory 498 (e.g., a memory stick) that can be removed and installed on a UBS port of user interface controller 412 (FIG. 38) or POS device 408 (FIG. 37) for use in preparing beverages. In another embodiment, external computer 498 executes recipe program 475 interactively with a user interface device via a network (e.g., the Internet).

[00173] It has been found by the present disclosure that assembly 100 allows operators to produce and dispense consistently prepared smoothie drinks in less than 40 seconds. Advantageously, assembly 100 generates ice through a fully integrated on-board ice system, ice maker, ice storage and portion control module 300. Ice maker, ice storage and portion control module 300 may, for example, have a 20-pound ice storage system that has the capability to create an additional 10 pounds of ice each hour, with a peak total of 270 pounds per day. Having ice generation on board removes the risk of injury through slips and falls, and it decreases the chance of bacterial contamination through mishandling. Additionally, the ice used in this machine is nugget-style ice, which is easier to fracture and blend down into the smoothie consistency. All of this allows for a perfectly blended beverage, for example, smoothie that fits within a normal QSR delivery time.

[00174] Each beverage, for example, smoothie is blended in its own cup, allowing the entire beverage or drink to be delivered to the customer and, in turn, raising product yield. Having each drink blended in its own cup improves flavor control and reduces allergy issues caused through cross-contamination. Assembly 100 may, for example, consistently provide twenty 16-ounce drinks per hour and, at peak capabilities, forty-five 16-ounce drinks for one-hour bursts. Money is also saved through the elimination of small wares or blender pots that were purchased and stored by restaurant owners in the past.

[00175] Advantageously, spindle assembly 242 goes through a rinse and/or sanitation process after each use to prevent flavor transfer and eliminate the need for manual dishwashing. Additionally, for example, two blending/mixing/cleaning module 303 included in assembly 100 to allow for the creation of a second drink while mixing the first, contributing to higher drink output and, consequently, to the bottom line of the operation. To overcome this challenge, nugget-style ice may be used with assembly 100. Nugget ice is softer than the more commonly known cube ice, and it is formed in a freeze barrel with an internal auger that continually scrapes the freeze surface. This flake-style ice is moved to the top of the freeze barrel by the ice auger, where it is extruded into the ice nugget. The resulting smaller ice greatly reduces the amount of blending required to create the drink. Additionally, the noise generated from the blending process is reduced by using this smaller nugget ice. This becomes especially important when the equipment is placed in the proximity of the front counter or near a drive-through window.

[00176] The blender pots in current smoothie machines are designed to fully mix the drink and grind the ice to a grain size that meets customer taste profiles. When mixing in a cup, there is no geometry to assist the mixing and grinding of the ice. To achieve the proper drink consistency, linear slide 241 moves blender blade 255 up and down in cup 15. This process simulates how a drink is made using a handheld stick mixer. Blender blade 255 lowers into the drink (about 25%), at which point blender blade 255 is energized. Once engaged, the spindle is lowered fully into the cup and allowed to dwell. This process grinds the majority of the ice, but at that point, the drink is not fully developed. The spindle is then raised and lowered following a profile created for the specific drink, taking into account the viscosity of the fluids, ice-to-fluid ratio, and the drink cup size.

[00177] It has been found by the present inventors that size limitations (footprint) may be achieved by a configuration of the components of

assembly 100. While a traditional machine creates drinks in a blender pot to mix more than one flavor, assembly 100 dispenses and mixes each drink in a serving cup, and may have dual spindles to maintain throughput and delivery times. Assembly 100 may address size requirements by vertical placement of the components.

[00178] Assembly 100 may maintain the accuracy of mixer 245 — used to create drink consistency— by stepper drive motors 241a control the linear slides 241. Stepper motors 241a provide the ability to create different blending profiles for the various types of drinks (coffee-based, fruit-based, fruit-plus-yogurt drinks). Counting the number of steps that stepper motor 241a travels allows precisely locating blender blade 255 every time a drink is blended.

[00179] Ice maker, ice storage and portion control module 300 maintains ice dispense accuracy. The ice dispense was then divided into portion cups. As the drink size changes, the number of individual dispense cups dropping ice into the beverage increases or decreases to match. To measure the number of ice dispenses, micro switches (located outside of the ice bin) were incorporated to count the number of cups. This method provides consistent ice delivery regardless of the level of ice in the bin.

[00180] Blender pots that are currently used are made of hard plastic, with the ability to withstand the forces used to crush ice into an acceptable consistency for a smoothie drink. Grinding the cube-style ice, most commonly found in QSRs, would put too much stress on the machine's blender and the customer's cup.

[00181] Definitions, acronyms, and abbreviations may include:

Abbreviation	**Definition**
UIC	User Interface Controller
SRB	System Relay Board
P-BUS	Peripheral bus
C-Bus	Communication Bus

CCA	Circuit Card Assembly
SFR	System Functional Requirements

[00182] In an example of a preferred embodiment, assembly 100 may be a "Smoothie maker system" that comprises an integrated ingredient dispensing unit, up to 4 mixing units (expandable from 2 in normal configuration), and a control panel for user operation. As depicted in FIG. 38, the system is designed using a Smart Relay CCA, two mixer CCAs (normal configuration), an optional communications board for external communications, and a user interface controller board. All of the subsystem boards communicate with each other using a MODBUS protocol and RS-485 physical link. Smart Relay CCA is responsible for dispensing control, monitoring and safety of the system ice-maker, and flavoring assembly/subsystem. Also the Smart Relay CCA provides the power and Modbus hub for the Smoothie System control electronics.

[00183] The Blender Controller CCA is responsible for position, speed, cleaning and safety control of the system blender assembly/subsystem, such as blender/mixer/cleaning module 303. It controls the blender blade, water and air pumps and senses cup present and door switch. The user interface controller board consists of a monochrome LCD display, membrane keypad for control and configuration.

[00184] The functional requirements of the exemplary embodiment are configured for mixing profiles and particular fluid selections (x out of 254 displayed). The system automatically goes into a configuration download menu if in idle when an SD card is inserted. The User Interface shall have a degrees F/C selection for temperature display in the setup mode. The User Interface shall have a degrees F/C selection for temperature display in the setup mode. The maximum number of flavors per serving shall be three and the minimum number of flavors per serving shall be one, unless dispensing ice only. A flavor selection status shall be toggled by pressing the button corresponding to the flavor in question.

Upon reaching the maximum Number of Flavors per Serving, the system shall not allow selection of any additional flavors; unselected flavors become locked-out. The user shall be able to change the flavor selection(s) by pressing the CANCEL button and selecting desired flavor(s).

[00185] The user shall be able to change the flavor selection(s) by first de-selecting a (the) flavor(s), then selecting the desired flavor(s). The unit shall monitor use cycles of flavors and provide a user indication on the display of low level for each flavor for early warning of flavor out.

[00186] The additives comprise a selection of two types of fresh fruit and yogurt. Only the yogurt is dispensed automatically; instead of dispensed, the fresh fruit has to be manually added. The fresh-fruit selections are used to compute the amounts that are dispensed. Fruit is placed in cup prior to receiving the ice and fruit. The Maximum Number Of Selectable Additives shall be 3 and the Minimum Number Of Selected Additives shall be 0.

[00187] The Fruit flavors and yogurt shall be stored in a refrigerated base designed to maintain a product temperature between $34^{O}F - 38^{O}F$. Base will be designed to accommodate up to 9 flavors. The base design will be such that flavors can be stored in “bag-in- box” packaging. The base will house flavor pumps (up to 9) and all associated delivery tubing, and air solenoid switches. The base will be designed to intake and discharge condenser air from the front of the unit. The base can be mounted on castors to allow access to rear of unit for cleaning. The base will be designed to meet NSF and UL requirements. The base will have openings in top to allow tubing to pass into dispense area. The base will provide a method air delivery and return to dispenser section to maintain product temperature to the dispense nozzle (per NSF). The base refrigeration system will require 120v AC with the option for 220v/50hz (Europe requirement).

[00188] The Smoothie machine will have on-board ice making capabilities to store 9kg of ice in addition to ice making capabilities. The ice machine will be designed to operate on 120V 60hz +/-10%. The ice machine shall have provisions for 220 50 Hz operation for Europe +/-10%.

[00189] Ice is normally dispensed during the smoothie making process but could also be dispensed exclusively. The system shall allow dispensing of ice in an exclusive manner (i.e. without flavors or water). Ice shall be dispensed in a portion amount that allows scaling for various drink cup sizes. Upon selection of the ice-only button, the system shall proceed to cup size selection. The ice-only button shall only be available when no flavors are selected. Conversely, upon selection of a flavor the ice-only button shall be disabled.

[00190] There shall be a Service maintenance mode to allow cleaning on the dispenser fluid lines.

[00191] The system shall allow cup size selections of small, medium large and extra large, with a provision for additional cup sizes determined by customer. Provisions will be made for cup storage on the unit. Cup size selection shall trigger the dispensing process. There shall be up to five configurable cup sizes with configurable volumes. The cup shall be placed under the dispense nozzle prior to drink selection (no UI to tell you).

[00192] The dispensing process shall use the cup size as a scaling factor to compute ingredient amounts; water, ice and selected flavors / additives. The ingredients and quantities dispensed shall be used to determine the mixing profile. Fruit flavor ingredients shall be delivered using air driven condiment pumps. Condiment pumps shall be located in the refrigerated space and shall be removable for easy access for service. Condiment pumps shall be energized using solenoid valves mounted in the air flow to the pumps. Condiment Pumps shall deliver a portioned amount of flavor. The amounts of ingredients used for each smoothie including a total of 9

flavored fluids, water, ice and up to 4 manually added types of additives shall be determined by the Dispense Algorithm.

[00193] The mixing process includes the actual mixing of the ingredients in a cup and a subsequent cleaning cycle to ensure that the blender's blades are clean for the next mixing cycle. The mixing operation shall be asynchronous to the dispensing operation. The mixing operation shall be determined by the current mixing profile and shall take no longer than 20 seconds. The mixing operation shall comprise at least 2 steps, blending & washing. The mixer shall be designed as a module that attaches to the ice machine and refrigerated base. The mixer module shall consist of a mixer spindle, blade, a linear slide, cup holder with water nozzles. To access the mixer module a protective door must be raised. The mixer module door shall contain micro-switches / sensors to locate the door position.

[00194] The drink is placed into the cup holder and the door is closed. When the closure of the door has been identified the mixer shall begin the mixing process. The mixer spindle shall index (via linear slide) down into the drink cup a predetermined from home position. The mixer blade should preferably be engaged before contacting the ingredients in the drink. The spindle shall then index into the drink to a depth of cup of approximately 75%. The spindle shall dwell in this location for a period of 15 seconds. The spindle shall then return to the initial location and continue to mix for a period. Upon completion the mixer blade shall be de-energized and the spindle returned to its home location. The door is then opened and the drink is then removed and served.

[00195] After the last mixer sequence the module shall begin the cleaning process when the mixer door is closed. The cleaning process shall start with the spindle being lowered into the mixing cavity and the spindle blade energized. A water solenoid shall be energized for 3 seconds and begin to spray rinse the spindle and cavity after the spindle blade is energized during a mixer cleaning cycle. An air solenoid connected to the water line

shall be energized to provide a high pressure blast of water during the mixer cleaning cycle. The module can be designed to operate with sanitizing agents in addition to water. The unit shall be able to detect run out of sanitizer fluid. When the mixer cleaning cycle has ended, the solenoids are de-energized and rinse water is drained. The mixer cleaning cycle shall take no longer than 5 seconds.

[00196] A mixing profile determines the steps to be performed during the mixing operation. Each step in the mixing profile specifies spindle's speed and time (how fast for how long) as well as position (with dwell time). A normal and Additive included mixing profile shall be available for each cup size. The mixing profiles shall be customer configurable.

[00197] The UIC shall support handling of USB storage devices. The UIC shall be capable of connecting to the C-Bus. The UIC shall provide 1-press on-the-fly language switch. The UIC shall be the P-Bus master.

[00198] The peripheral bus or P-Bus shall connect the User Interface Controller to the system's peripherals (the System Relay Board and the Mixer Control Boards) via RS-485. The P-Bus shall use ModBus RTU.

[00199] It should also be noted that the terms "first", "second", "third", "upper", "lower", and the like may be used herein to modify various elements. These modifiers do not imply a spatial, sequential, or hierarchical order to the modified elements unless specifically stated.

[00200] While the present disclosure has been described with reference to one or more exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the present disclosure. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the disclosure without departing from the scope thereof. Therefore, it is intended that the present

disclosure not be limited to the particular embodiment(s) disclosed as the best mode contemplated, but that the disclosure will include all embodiments falling within the scope of the appended claims.

WHAT IS CLAIMED IS:

1. A method of operating a computer interactively with a user interface device to prepare a beverage recipe for an integrated beverage system that comprises a dispensing module that dispenses one or more selected ingredients into a beverage container and a blending/mixing module that performs one or both of a blending operation and a mixing operation to stir said ingredients in said beverage container, said method comprising:

with said user interface device and said computer:

preparing a beverage by:

selecting a beverage recipe from a menu of beverage recipes; and

operating said dispensing module and said blending/mixing module to prepare a beverage according to said beverage recipe with ingredients selected from a menu of beverage recipes to stir said selected ingredients in said beverage container;

creating a new beverage recipe according to a recipe program stored in memory of the computer and that when executed by the computer comprises:

presenting to a user one or more screens on a display of said user interface device for said user to enter one or more ingredients with recipe parameters for said new beverage recipe; and

saving said entered ingredients with recipe parameters as said new beverage recipe in said menu library, wherein said recipe parameters comprise an ice quantity and one or more of a container size, a water quantity, a flavor quantity and a mixing quantity, and wherein said new beverage recipe is selectable by said step of preparing said beverage.

2. The method of claim 1, further comprising repeating said presenting and saving steps for one or more new beverage recipes.

3. The method of claim 1, wherein said computer is selected from the group consisting of: a user interface controller of said integrated beverage system, a point of sale device, and a computer that is independent of said integrated beverage system.

4. The method of claim 1, further comprising putting said entered recipe parameters in an executable format for execution by one or more controllers of said integrated beverage system that are in communication with said dispensing module and/or said blending/mixing module.

5. The method of claim 1, wherein said entered recipe parameters comprise one or more mixin combinations that comprise pre-dispense, pre-blend, pre-mix and post blend/mix.

6. The method of claim 2, wherein said entered parameters further comprise a name for each of said beverage recipes.

7. The method of claim 1, further comprising placing said beverage recipe in a category or categories of recipes.

8. The method of claim 1, wherein said entered recipe parameters further comprise one or more of beverage flavors, ingredients, ice, water and beverage container size.

9. The method of claim 1, further comprising a blending profile that comprises a blending speed of a blending element, position, travel time and a dwell time of said mixing element in said beverage container.

10. The method of claim 9, wherein said blending profile further comprises a plurality of blending speeds, levels, travel times between levels and dwell times of said blending element in said beverage container.

11. The method of claim 1, wherein said mixing profile comprises a mixing speed of a mixing element, position, travel time and a dwell time of said mixing element in said beverage container.

12. The method of claim 11, wherein said mixing profile comprises a plurality of mixing speeds, levels, travel times between levels and dwell times of said mixing element in said beverage container.

13. An integrated beverage system comprising:

a dispensing module that dispenses one or more selected ingredients into a beverage container;

a blending and/or mixing module that performs one or both of a blending operation and a mixing operation to stir said ingredients in said beverage container;

a computer that interacts with a user interface device (a) to operate said dispensing module and said blending/mixing module to prepare a beverage according to a beverage recipe with ingredients selected from a menu library of beverage recipes to stir said selected ingredients in said beverage container, and (b) to create a new beverage recipe according to a recipe program that when executed comprises:

presenting to a user one or more screens on a display of said user interface device for a user to enter one or more ingredients with recipe parameters for said new beverage recipe; and

saving said entered ingredients with recipe parameters as said new beverage recipe in said menu library, wherein said recipe parameters comprise an ice quantity and one or more of a container size, a water quantity, a flavor quantity and a mixing quantity, and wherein said new beverage recipe is selectable by said user interface device to operate said dispensing module and said blending/mixing module to prepare a beverage in said beverage container.

14. The integrated beverage system of claim 13, further comprising repeating said presenting and saving steps for one or more new beverage recipes.

15. The integrated beverage system of claim 13, wherein said computer is selected from the group consisting of: a user interface controller of said integrated beverage system, a point of sale device, and a computer that is independent of said integrated beverage system.

16. The integrated beverage system of claim 15, wherein said recipe program further comprises putting said entered recipe parameters in an executable format for execution by at least one controller of said integrated beverage system that is in communication with said dispensing module and/or said blending/mixing module.

17. The integrated beverage system of claim 13, wherein said entered recipe parameters comprise one or more mixin combinations that comprise pre-dispense, pre-blend, pre-mix and post blend/mix.

18. The integrated beverage system of claim 14, wherein said entered parameters futher comprise a name for each of said beverage recipes.

19. The integrated beverage system of claim 14, wherein said recipe program further comprises placing said beverage recipe in a category or categories of recipes.

20. The integrated beverage system of claim 13, wherein said entered recipe parameters further comprise one or more of beverage flavors, ingredients, ice, water and container size.

21. The integrated beverage system of claim 13, further comprising a blending profile that comprises a blending speed of a blending element,

position, travel time and a dwell time of said mixing element in said beverage container.

22. The integrated beverage system of claim 21, wherein said blending profile further comprises a plurality of blending speeds, levels, travel times between levels and dwell times of said mixing element in said beverage container.

23. The integrated beverage system of claim 13, wherein said mixing profile comprises a mixing speed of a mixing element, position, travel time and a dwell time of said mixing element in said beverage container.

24. The integrated beverage system of claim 23, wherein said mixing profile further comprises a plurality of mixing speeds, levels, travel times between levels and dwell times of said mixing element in said beverage container.

25. A non-transitory computer readable medium having stored thereon programmable instructions comprising at least a recipe program for execution by a computer that operates interactively with a user interface device to prepare a beverage recipe for an integrated beverage system that comprises a dispensing module that dispenses one or more selected ingredients into a beverage container and a blending/mixing module that performs one or both of a blending operation and a mixing operation to stir said ingredients in said beverage container, the programmable instructions executable by the computer to interact with said user interface device to perform the steps of:

preparing a beverage by:

selecting a beverage recipe from said menu library of beverage recipes; and

operating said dispensing module and said blending/mixing module to prepare a beverage according to said selected beverage recipe with ingredients, which are stirred in said beverage container;

creating a new beverage recipe by:

presenting to a user one or more screens on a display of said user interface device for said user to enter ingredients with recipe parameters for said new beverage recipe; and

saving said entered ingredients with recipe parameters as said new beverage recipe in said menu library of beverage recipes, wherein said recipe parameters comprise an ice quantity and one or more of a container size, a water quantity, a flavor quantity and a mixing quantity, and wherein said new beverage recipe is selectable by said selecting step.

26. The non-transitory computer readable medium of claim 25, further comprising repeating said presenting and saving steps for one or more additional new beverage recipes.

27. The non-transitory computer readable medium of claim 25, wherein said computer is selected from the group consisting of: a user interface controller of said integrated beverage system, a point of sale device, and a computer that is independent of said integrated beverage system.

28. The non-transitory computer readable medium of claim 25, further comprising putting said entered recipe parameters in an executable format for execution by at least one controller of said integrated beverage system that is in communication with said dispensing module and/or said blending and/or mixing module.

29. The non-transitory computer readable medium of claim 25, wherein said entered recipe parameters comprise one or more mixin

combinations that comprise pre-dispense, pre-blend, pre-mix and post blend / mix.

30. The non-transitory computer readable medium of claim 25, wherein said entered parameters further comprise a name for said beverage recipe.

31. The non-transitory computer readable medium of claim 25, further comprising placing said beverage recipe in a category or categories of recipes.

32. The non-transitory computer readable medium of claim 25, wherein said entered recipe parameters further comprise one or more of beverage flavors, ingredients, ice, water and container size.

33. The non-transitory computer readable medium of claim 25, further comprising a blending profile that comprises a blending speed of a blending element, position, travel time and a dwell time of said blender element in said beverage container.

34. The non-transitory computer readable medium of claim 33, wherein said blending profile further comprises a plurality of blending speeds, levels, travel times between levels and dwell times of said blending element in said beverage container.

35. The non-transitory computer readable medium of claim 25, wherein said mixing profile comprises a mixing speed of a mixing element, position, travel time and a dwell time of said mixing element in said beverage container.

36. The non-transitory computer readable medium of claim 35, wherein said mixing profile further comprises a plurality of mixing speeds,

levels, travel times between levels and dwell times of said mixing element in said beverage container.

37. The method of claim 1, wherein said said blending and/or mixing module further comprises integrated cleaning.

38. The integrated beverage system of claim 13, wherein said said blending and/or mixing module further comprises integrated cleaning.

39. The non-transitory computer readable medium of claim 25, wherein said said blending and/or mixing module further comprises integrated cleaning.

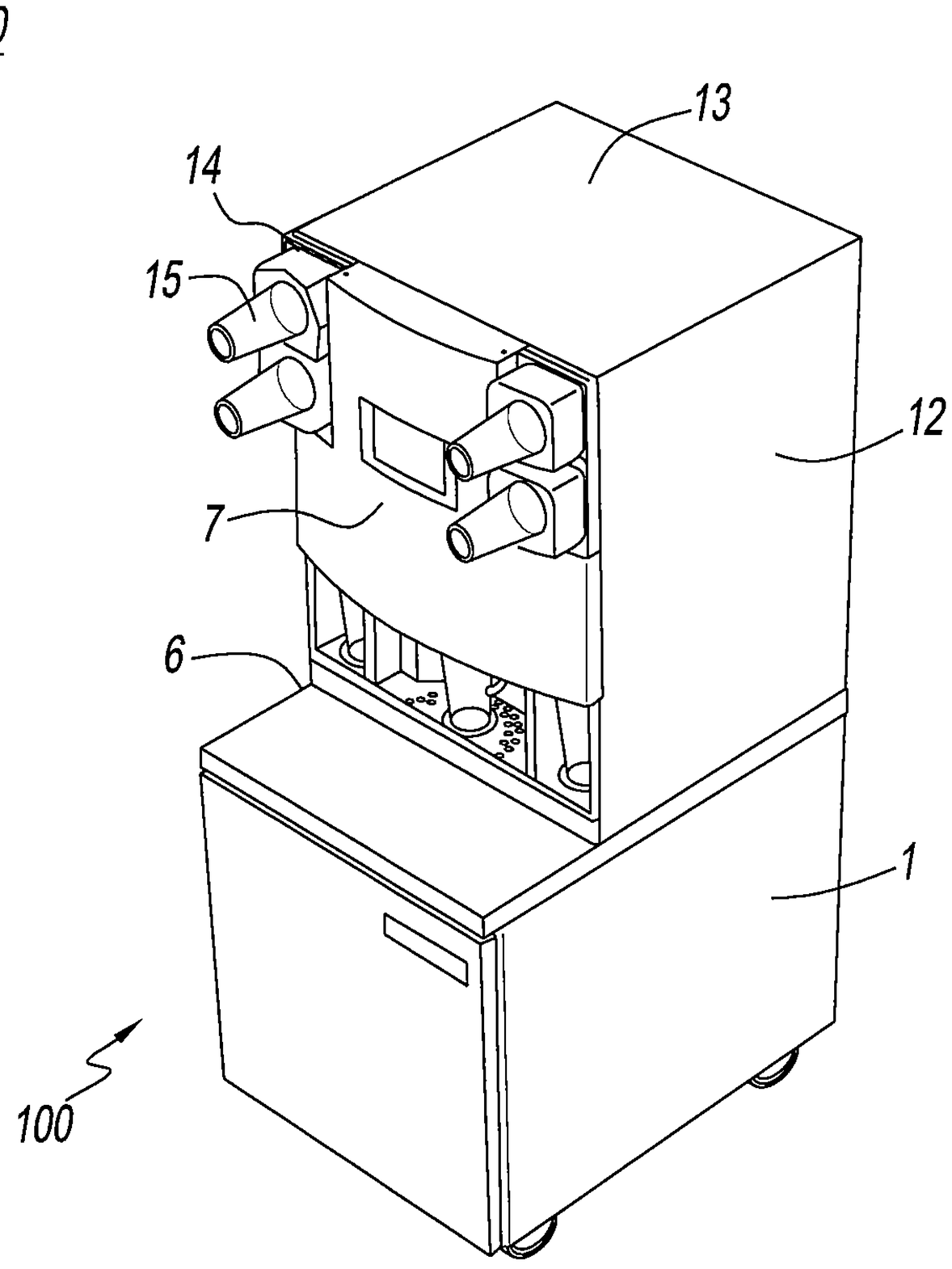


Fig. 1

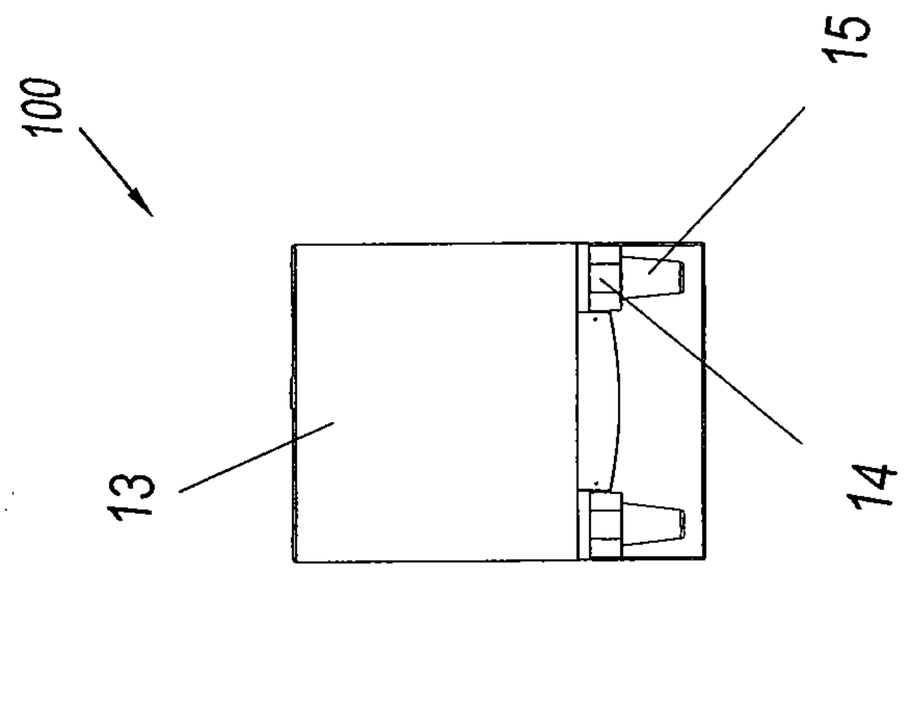


Fig. 4

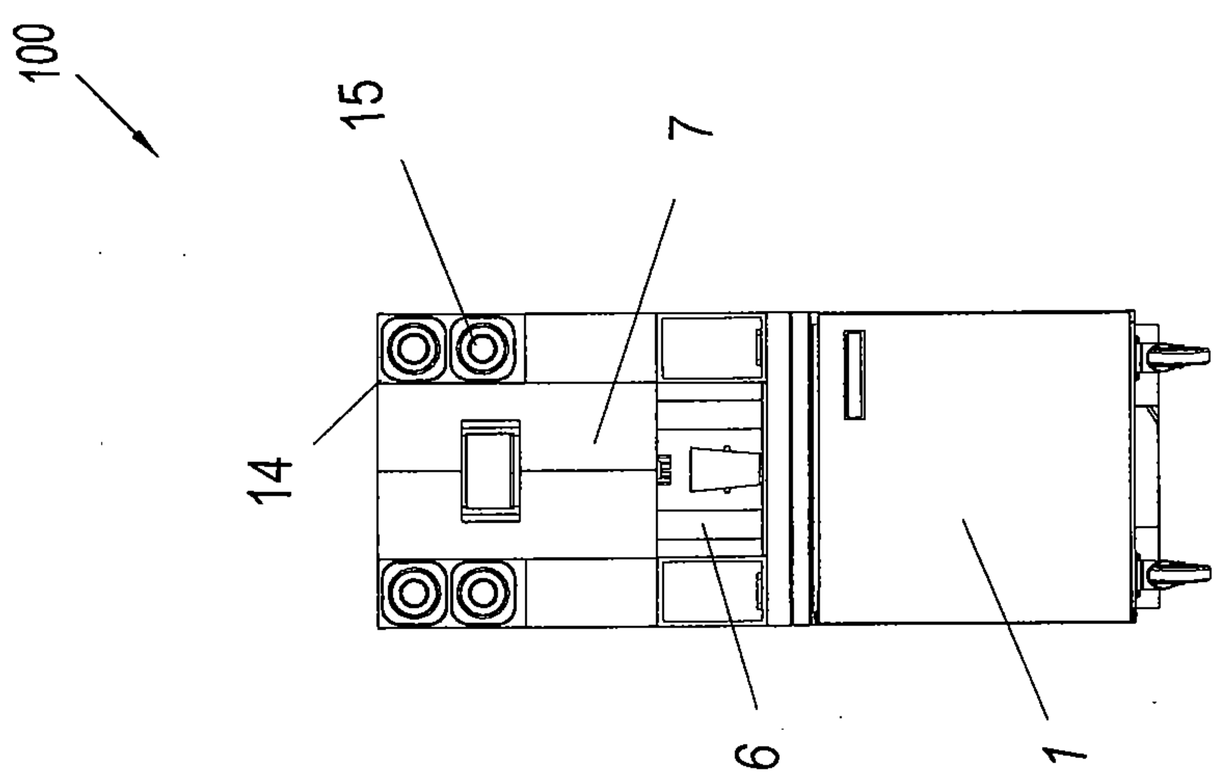


Fig. 3

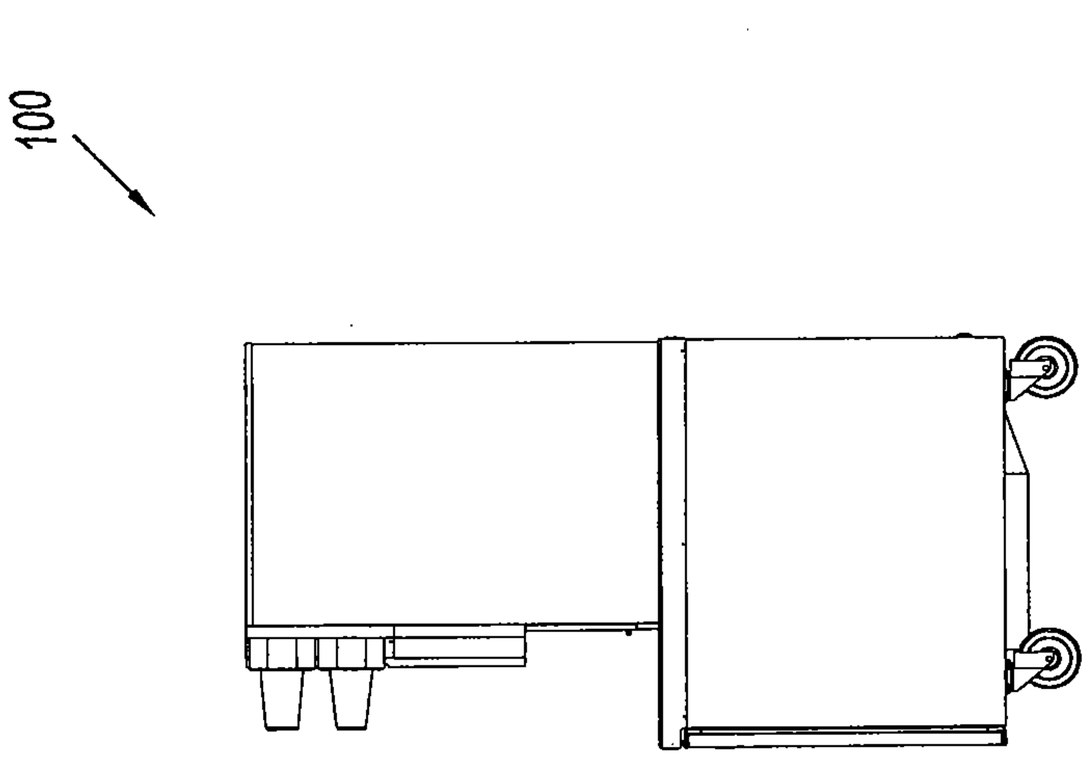


Fig. 2

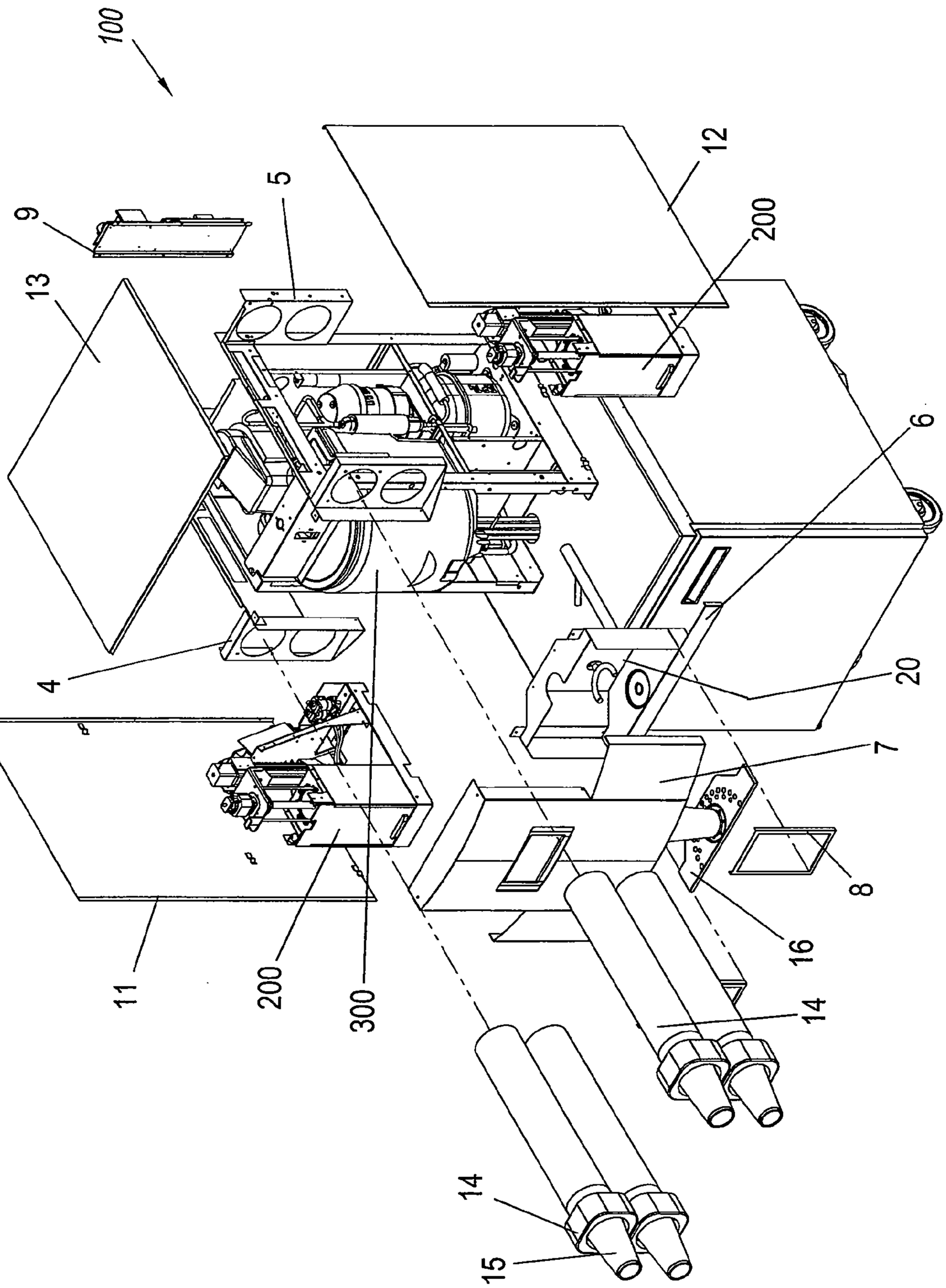


Fig. 5

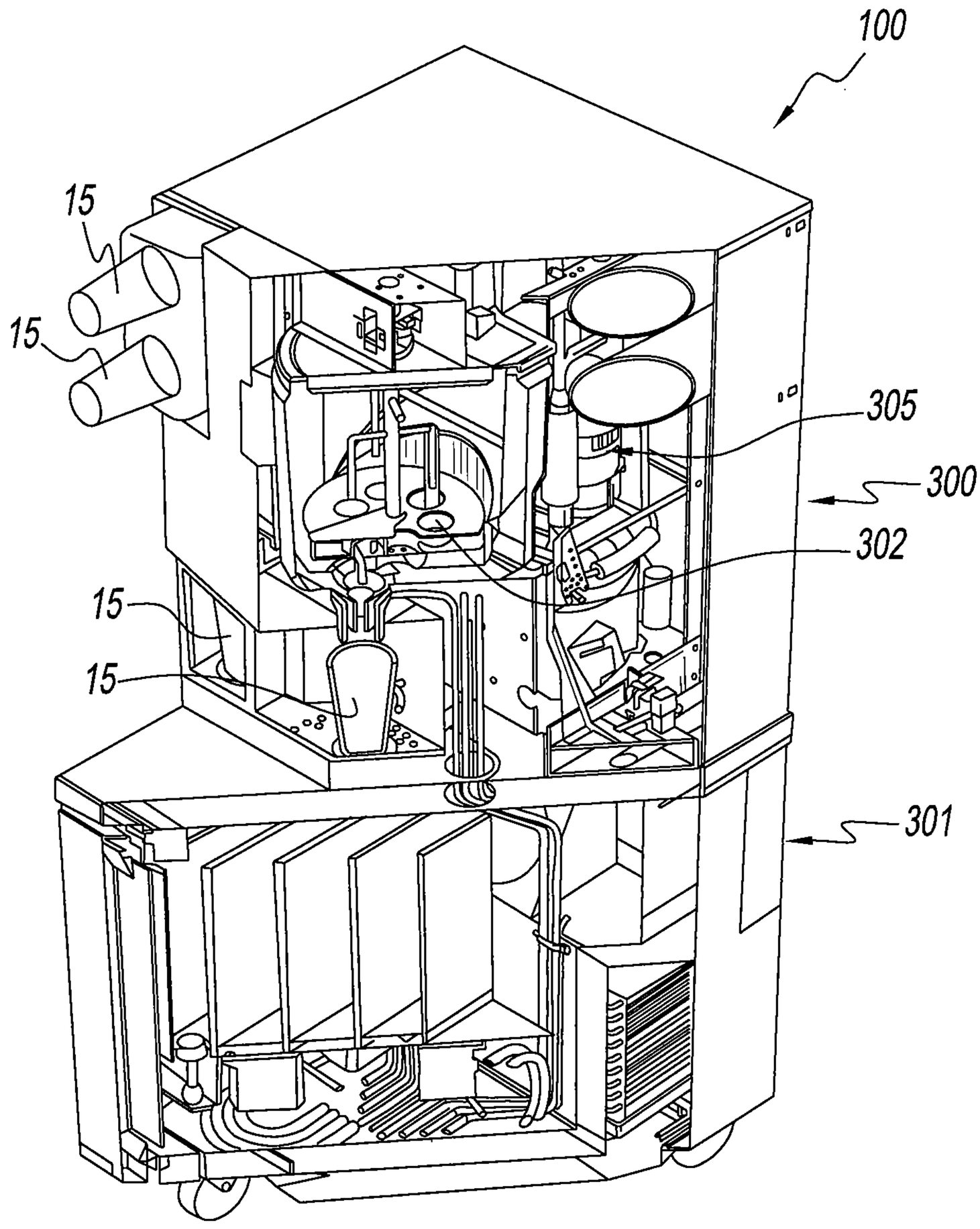


Fig. 6

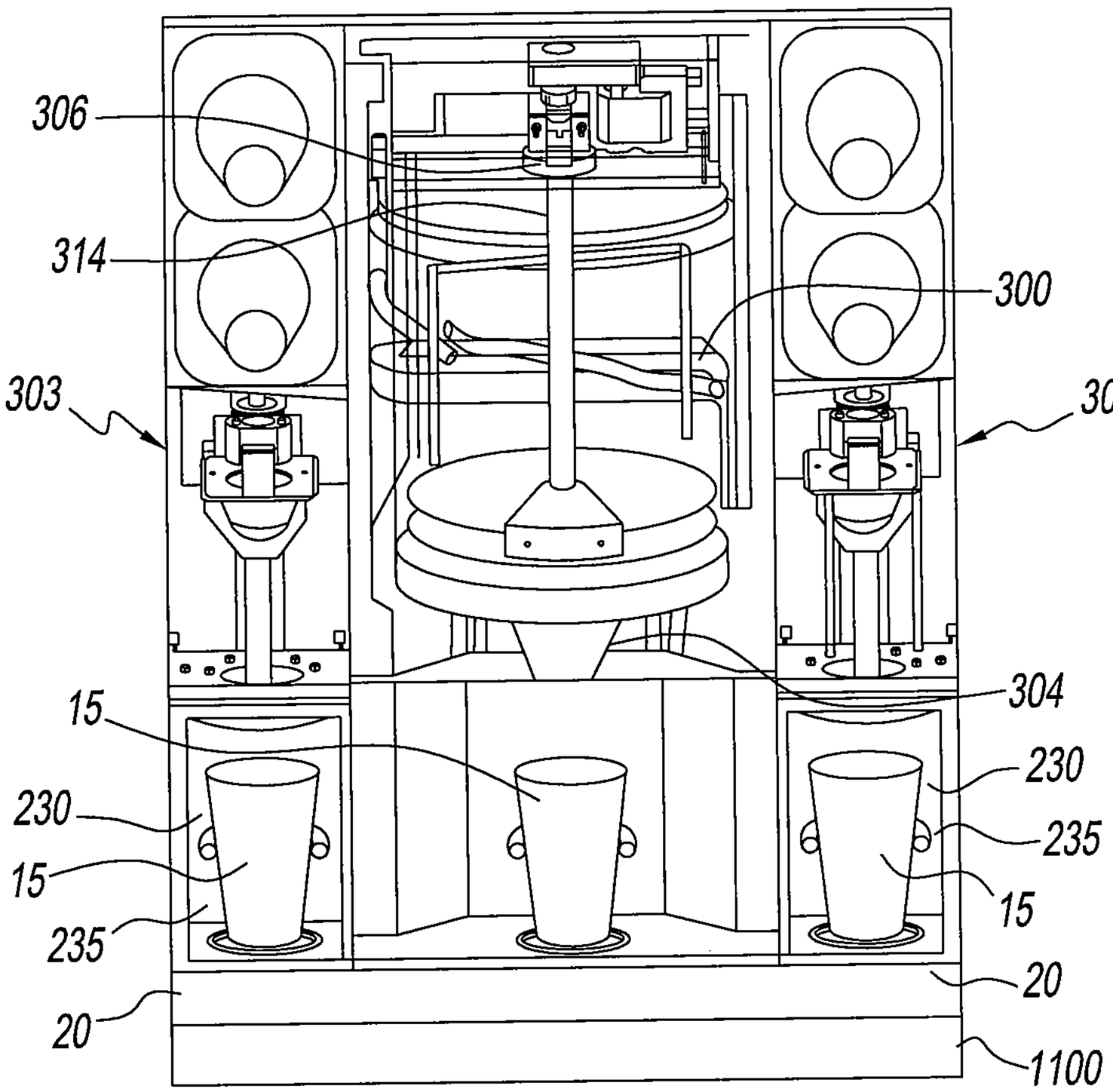


Fig. 7

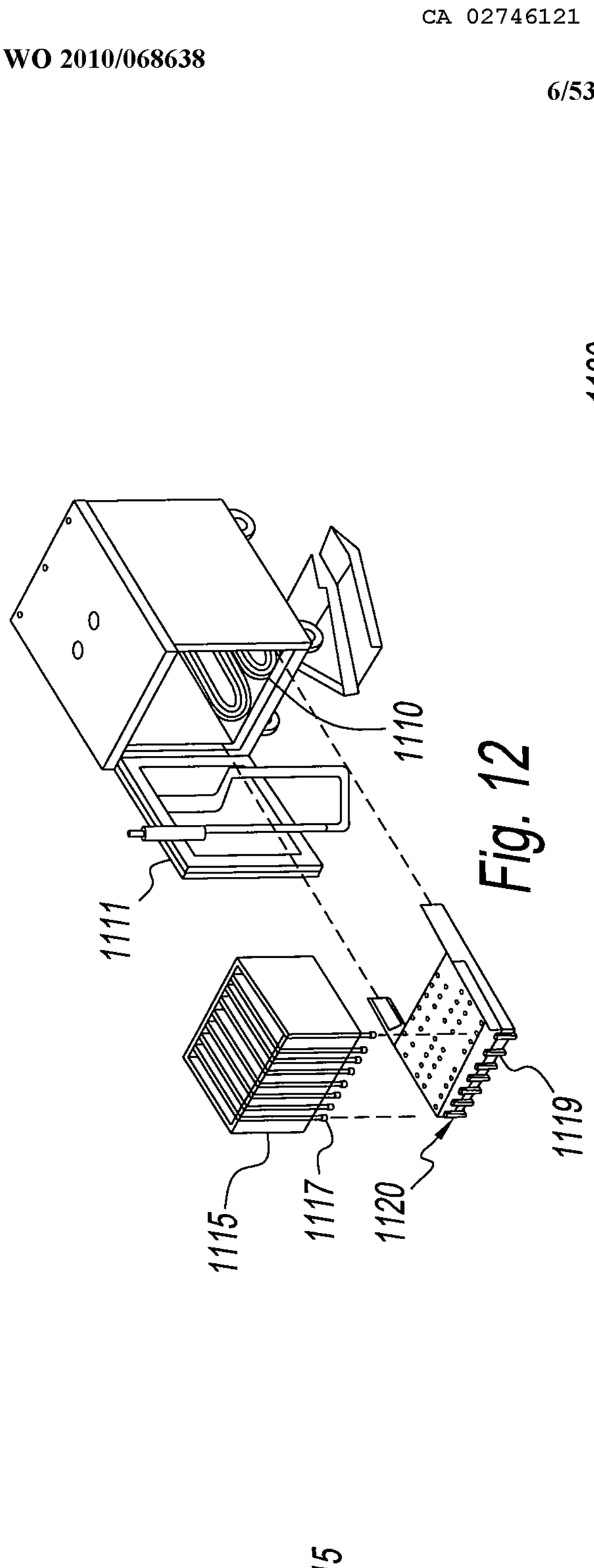


Fig. 12

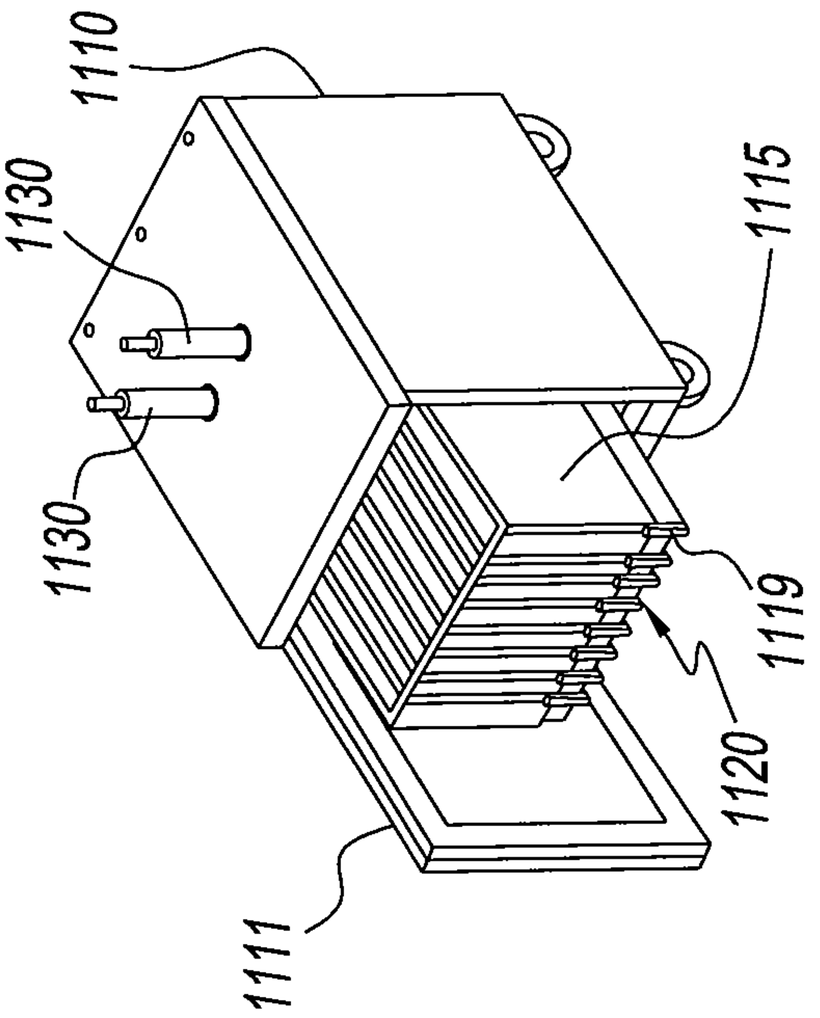


Fig. 8

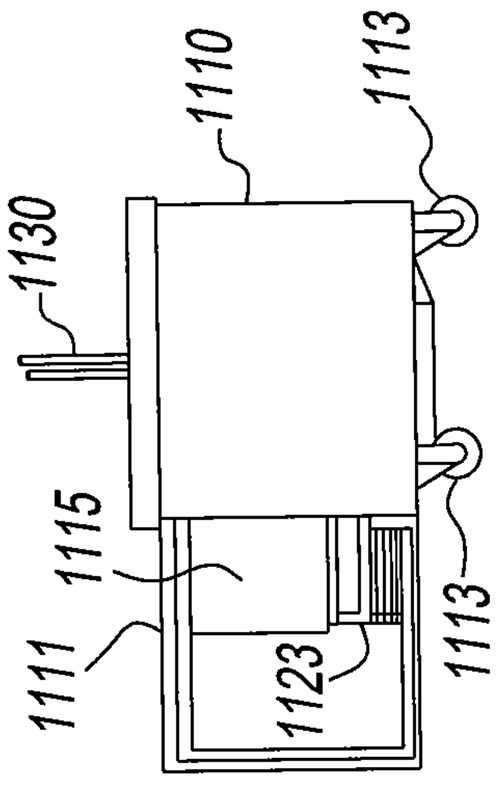


Fig. 9

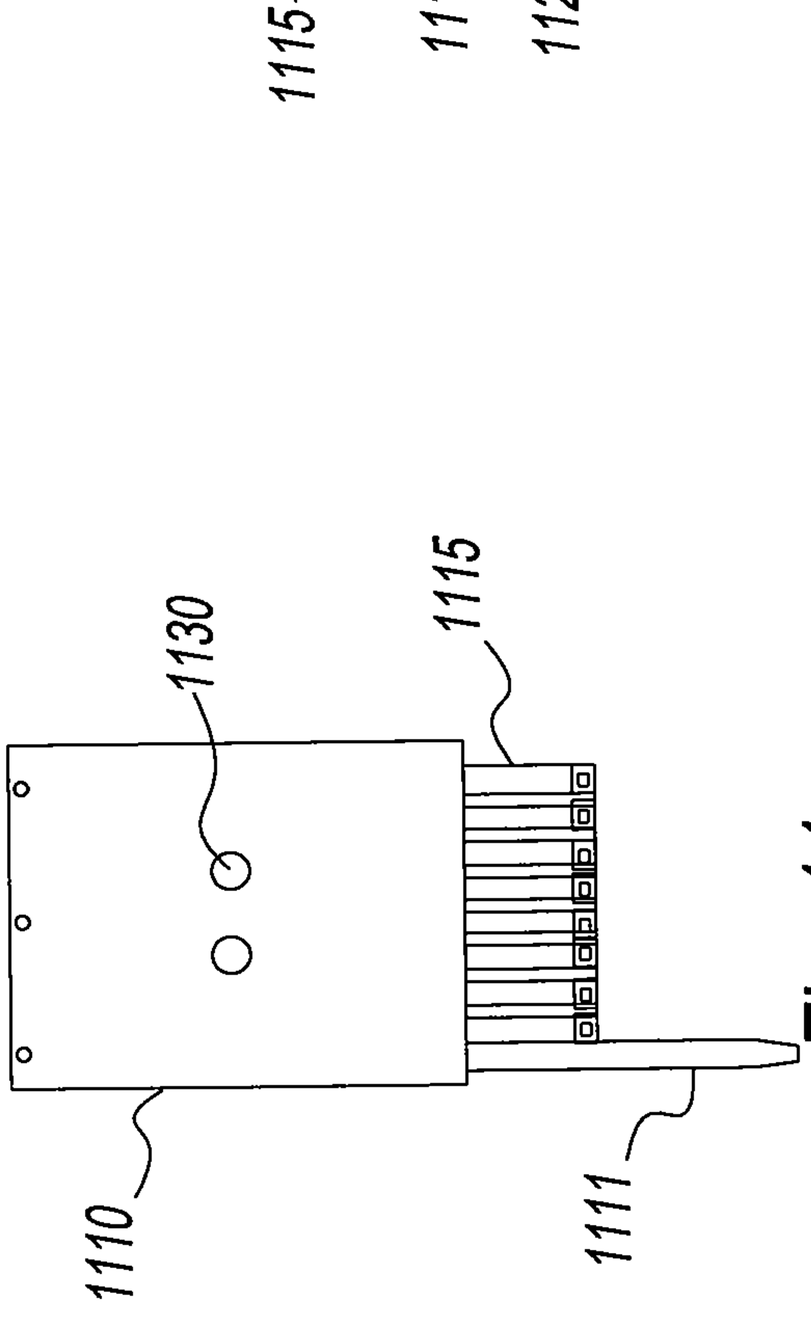


Fig. 11

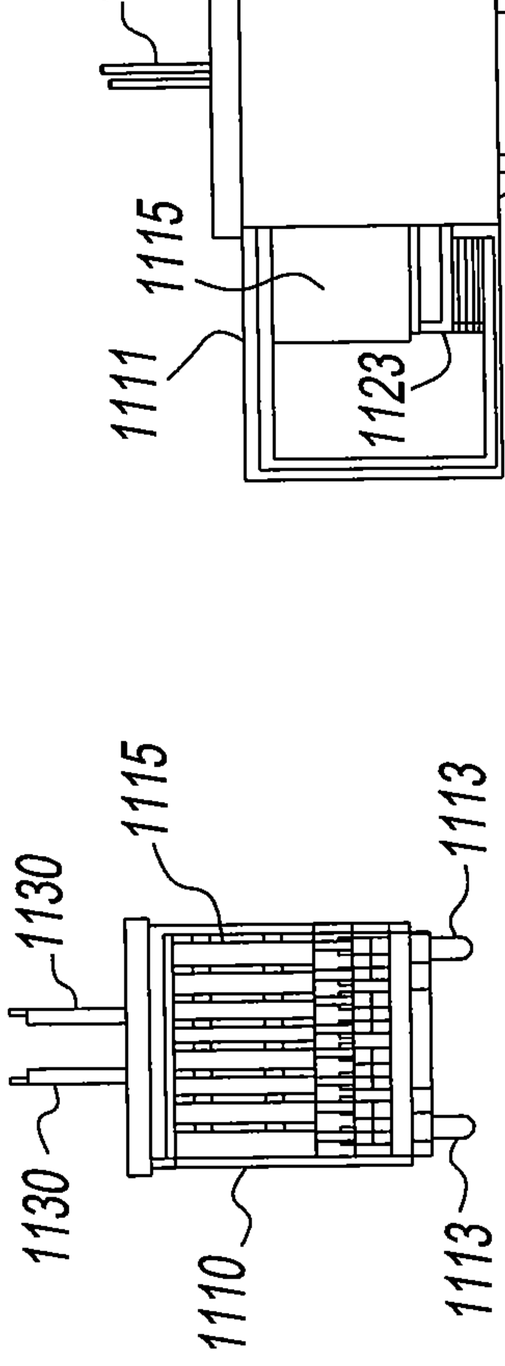


Fig. 10

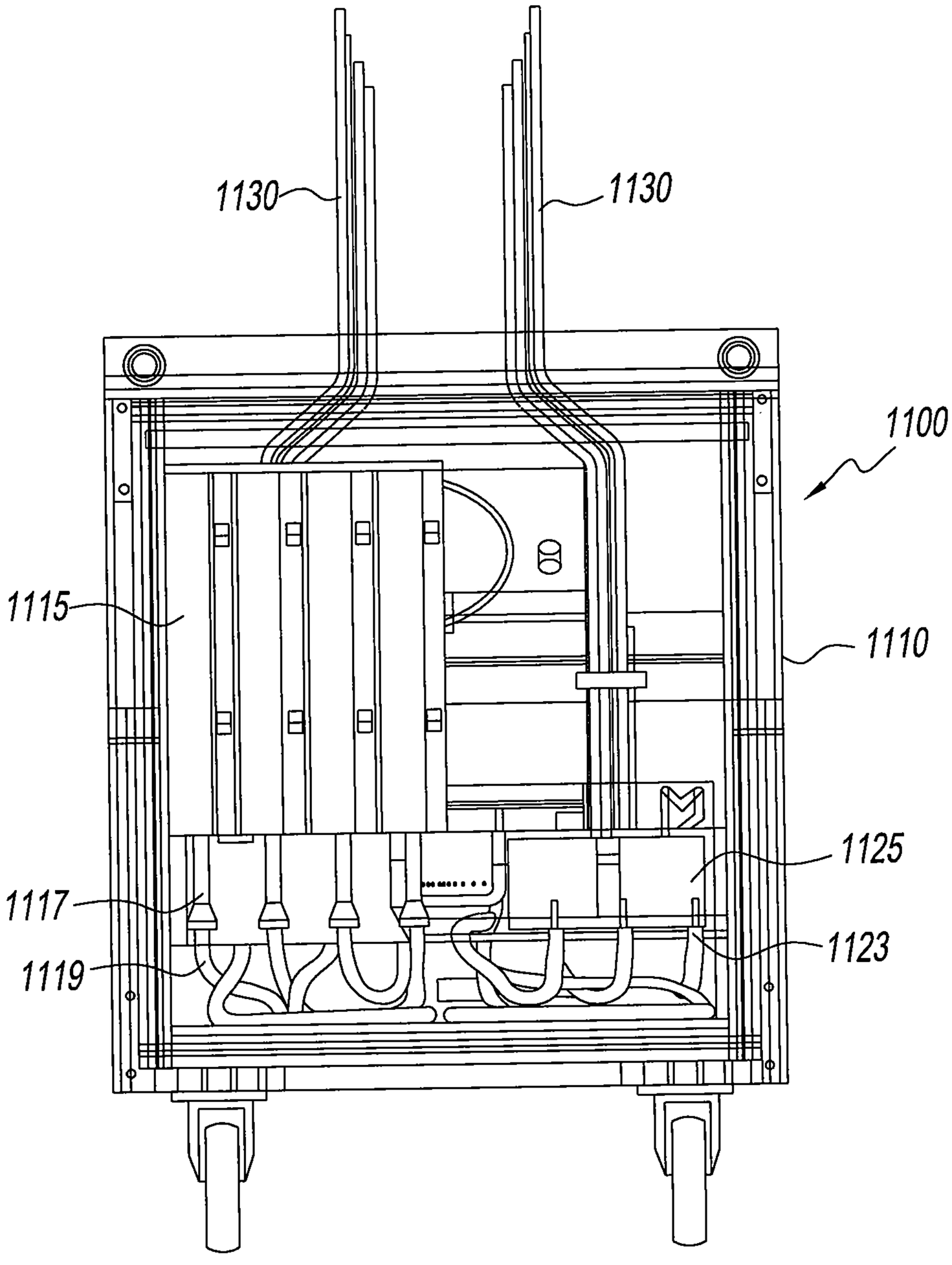


Fig. 13

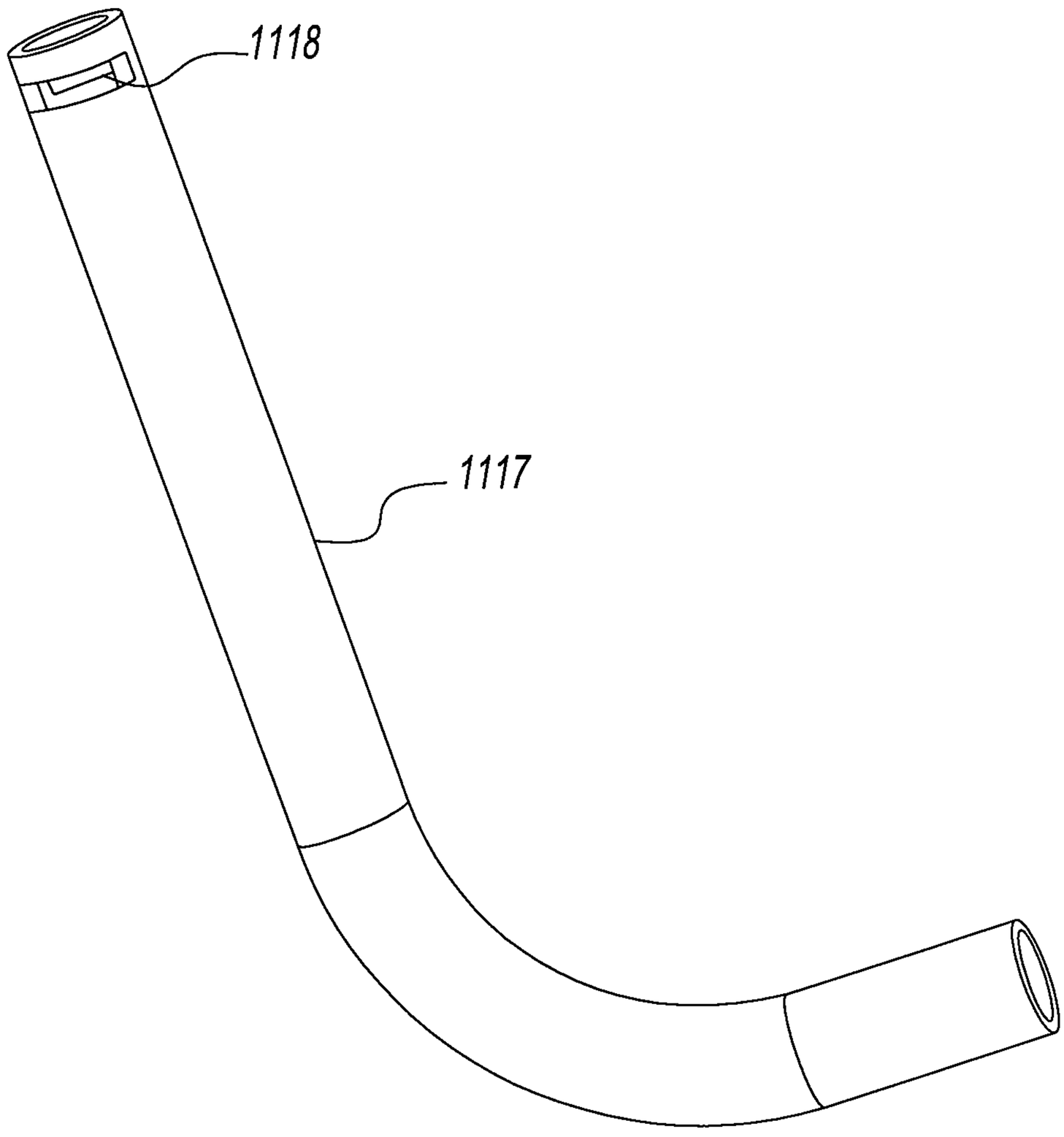


Fig. 13a

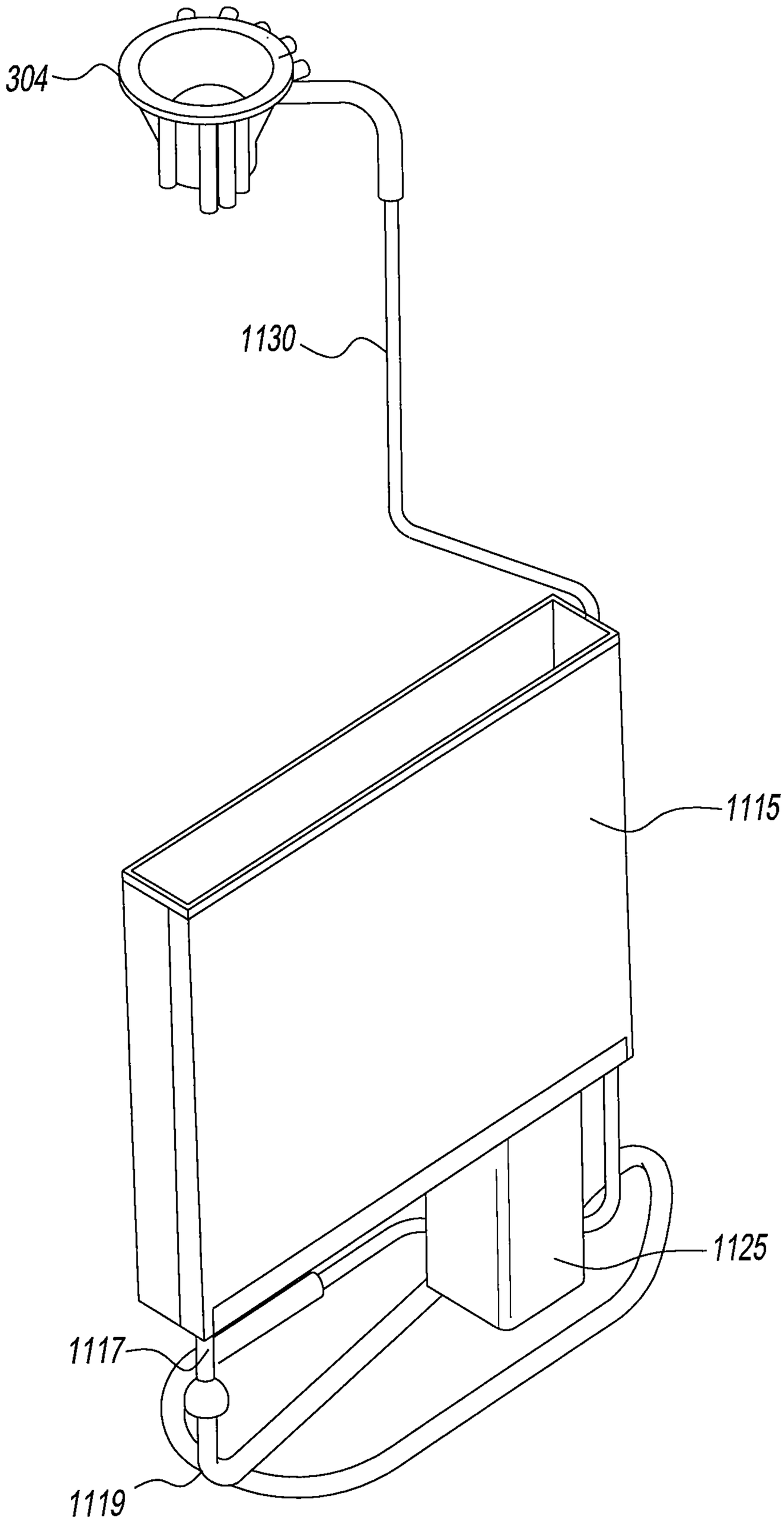


Fig. 14

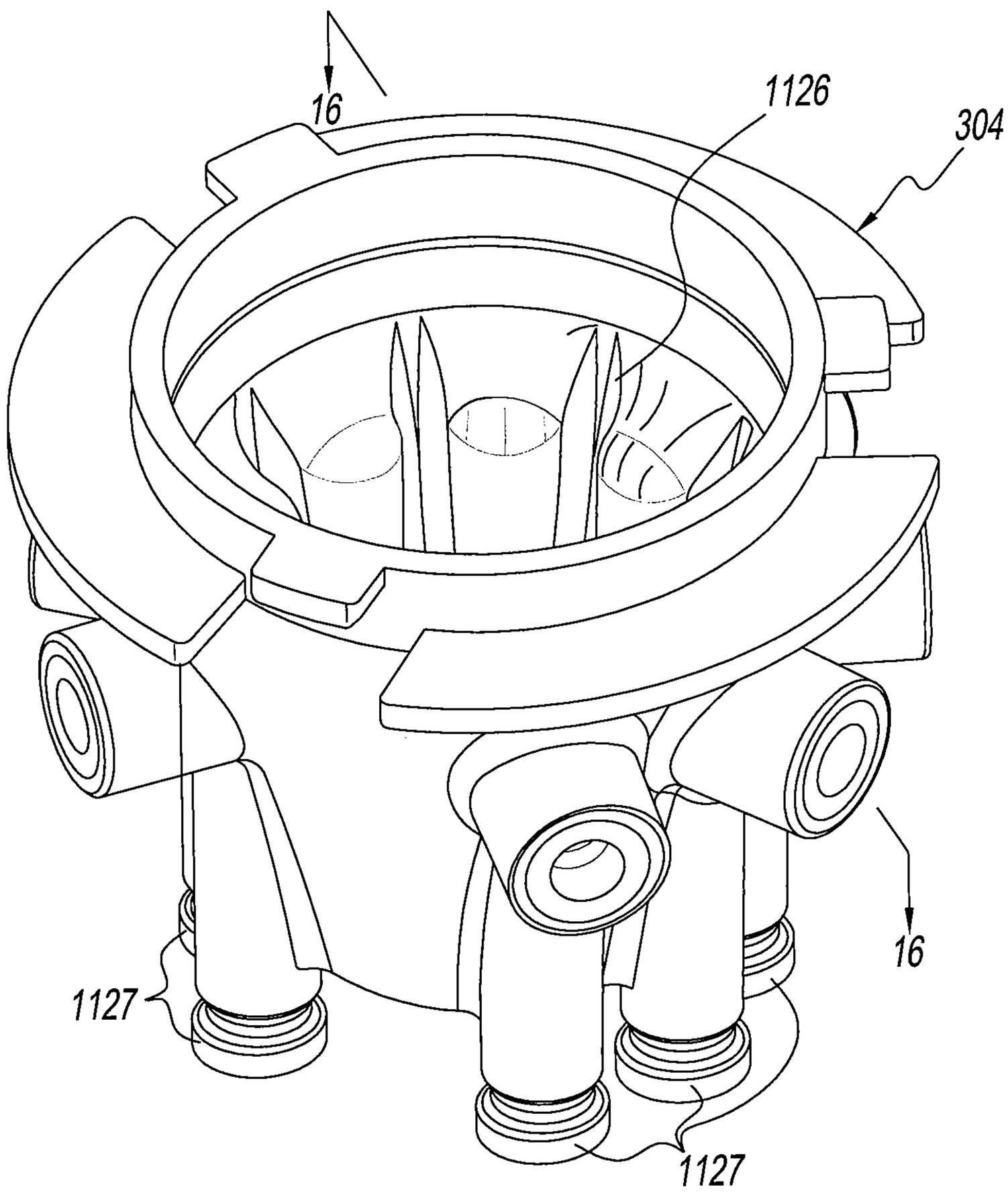


Fig. 15

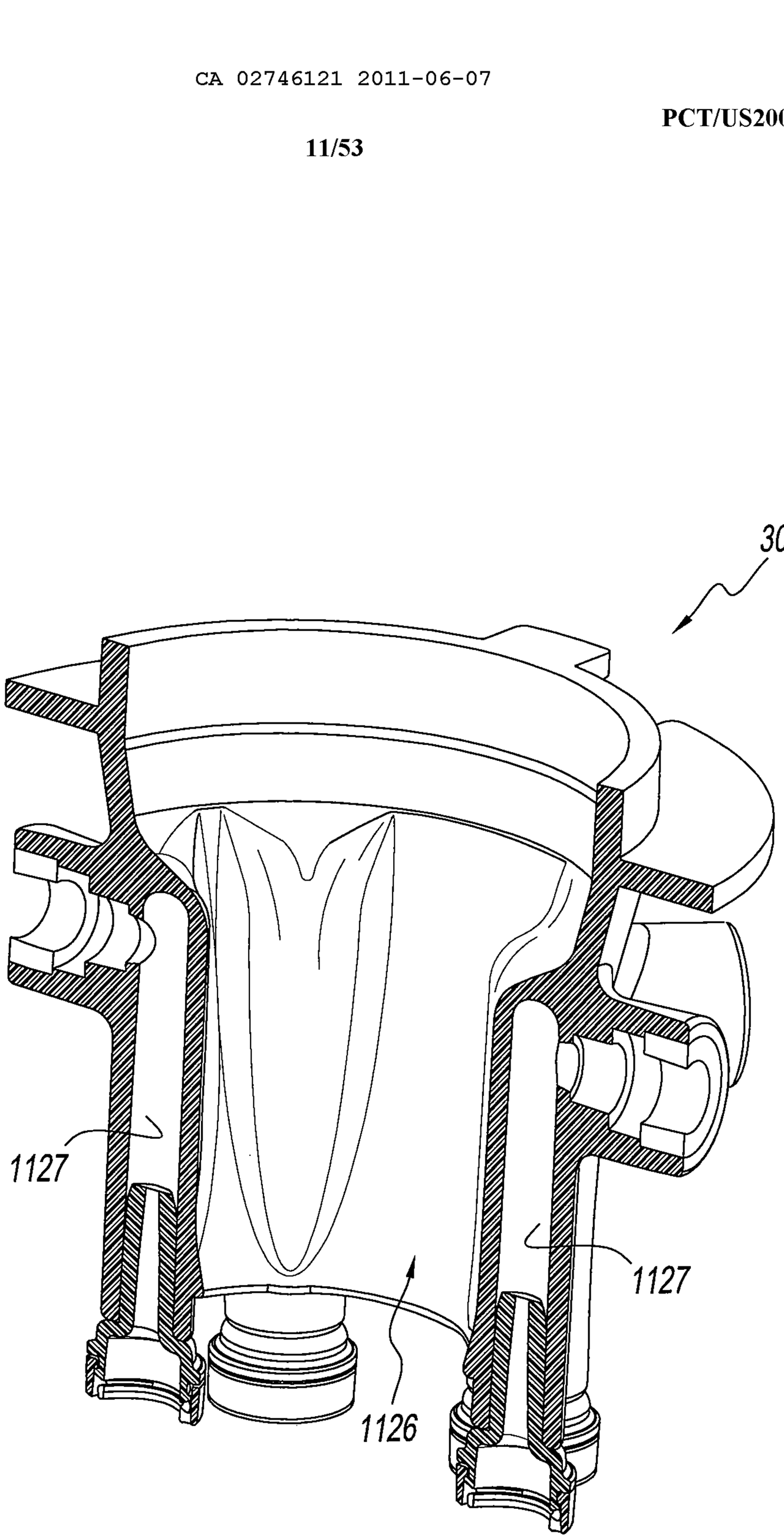


Fig. 16

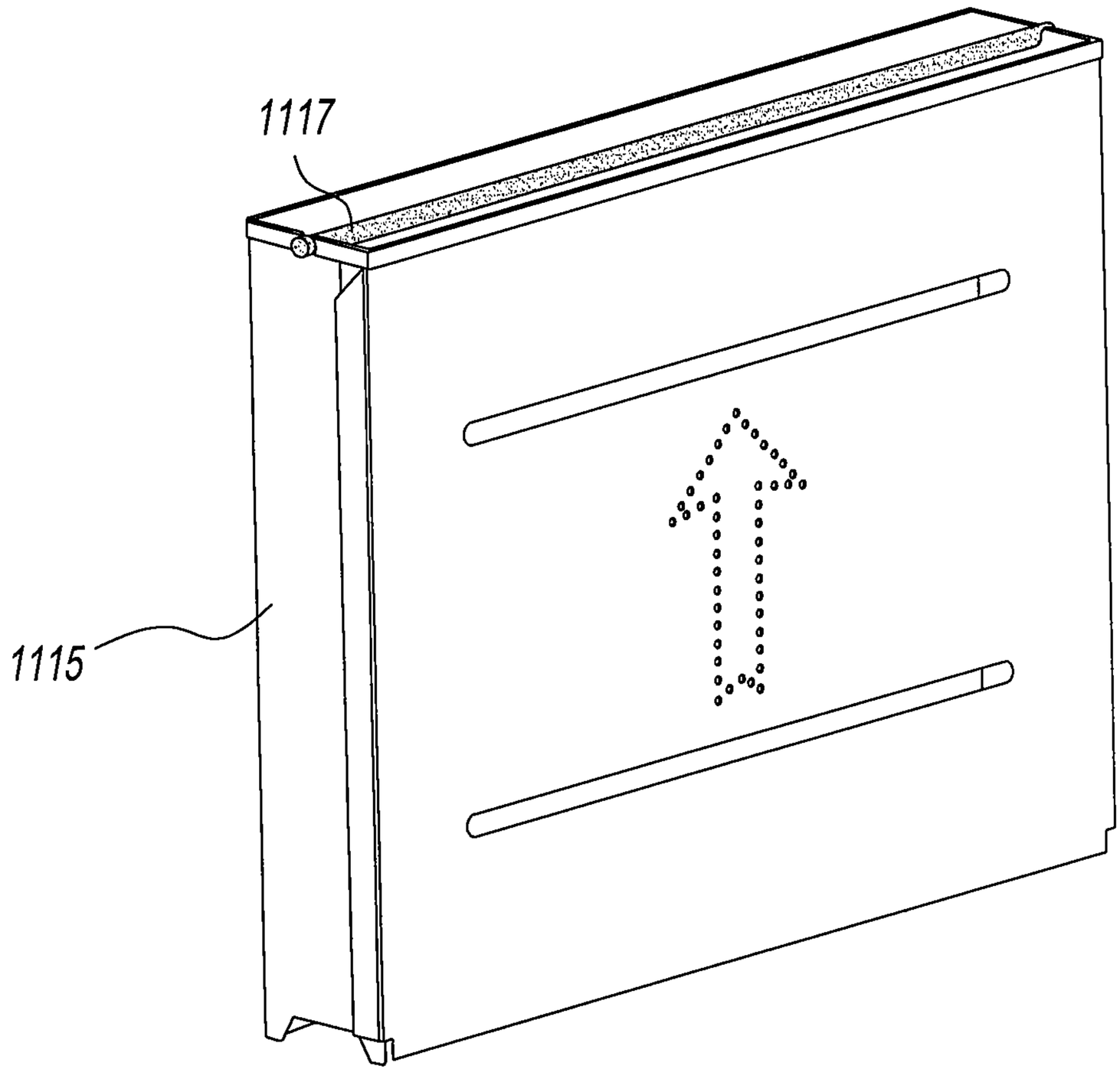


Fig. 17

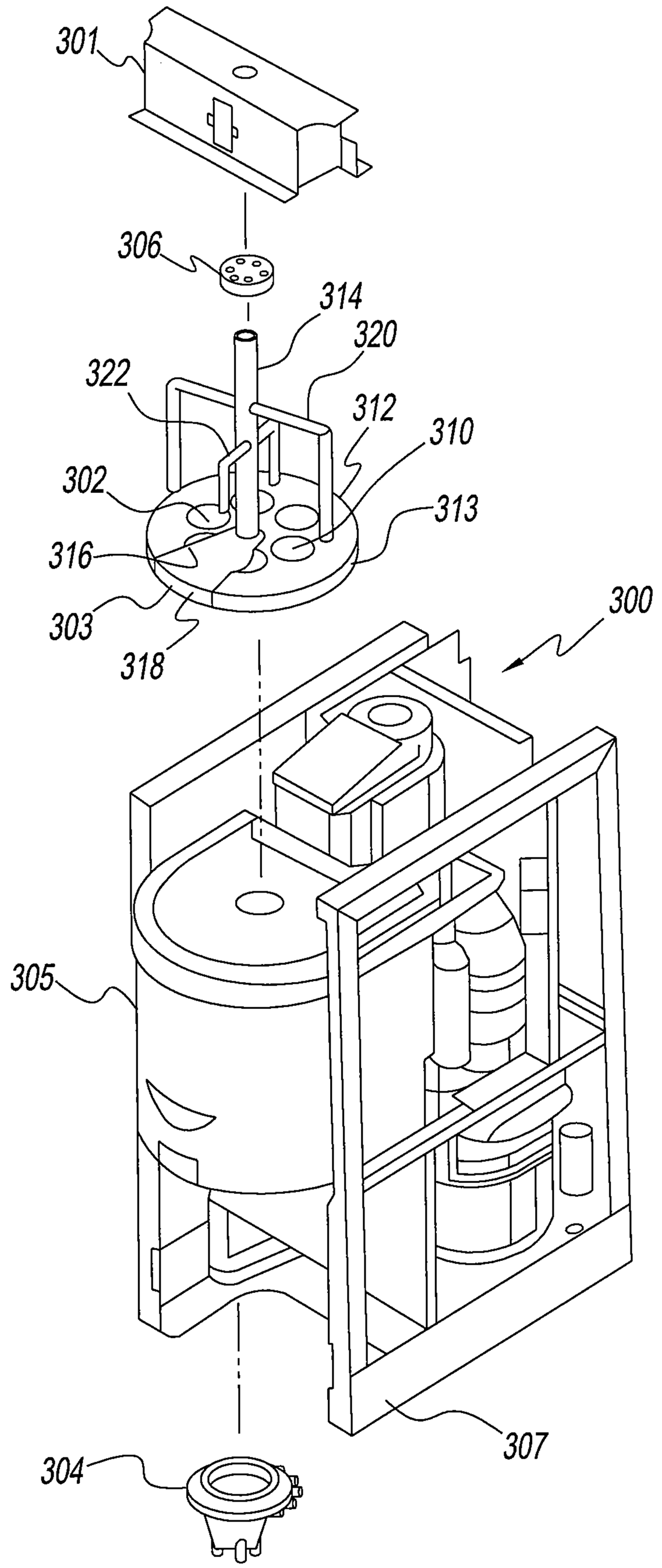


Fig. 18

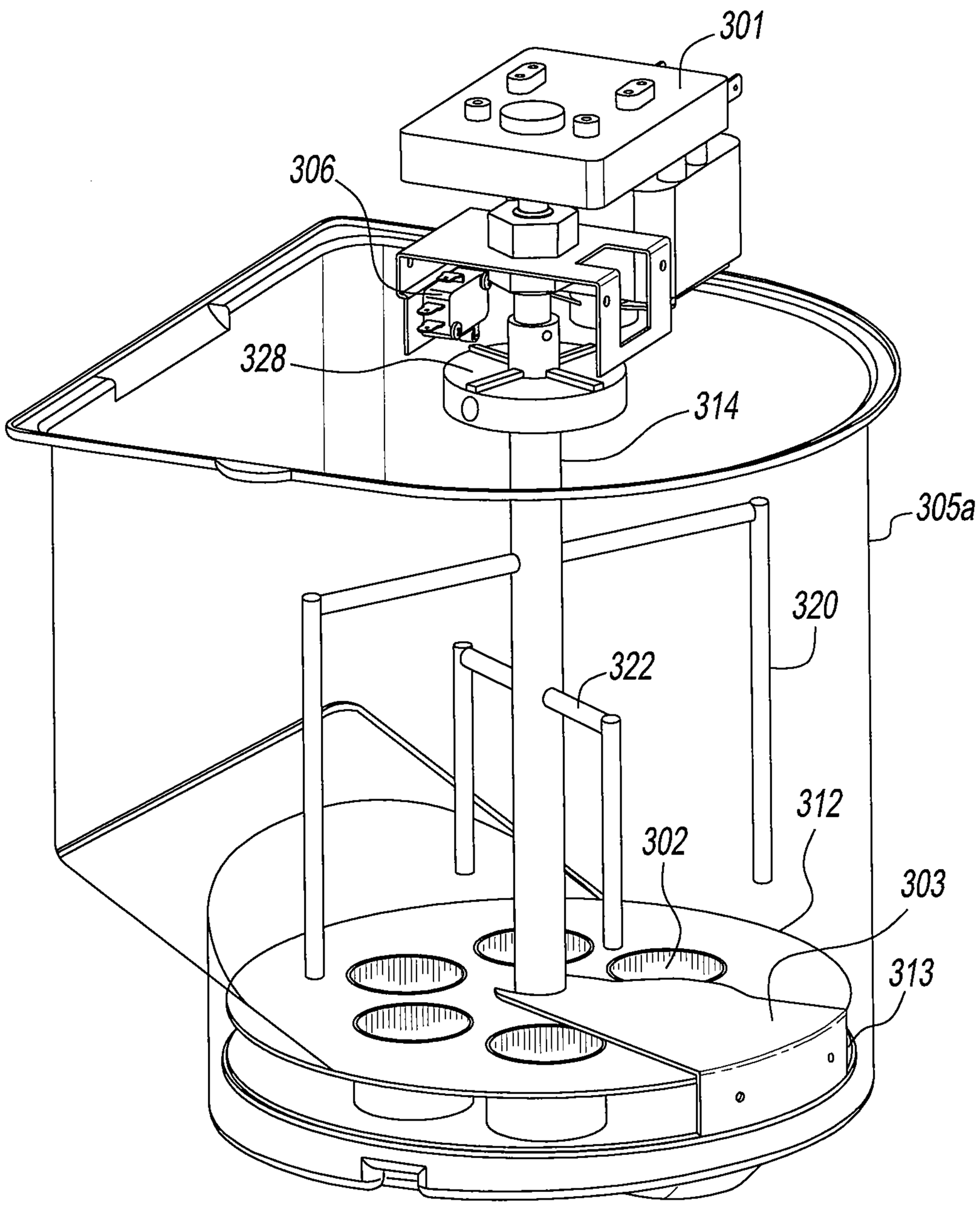


Fig. 19

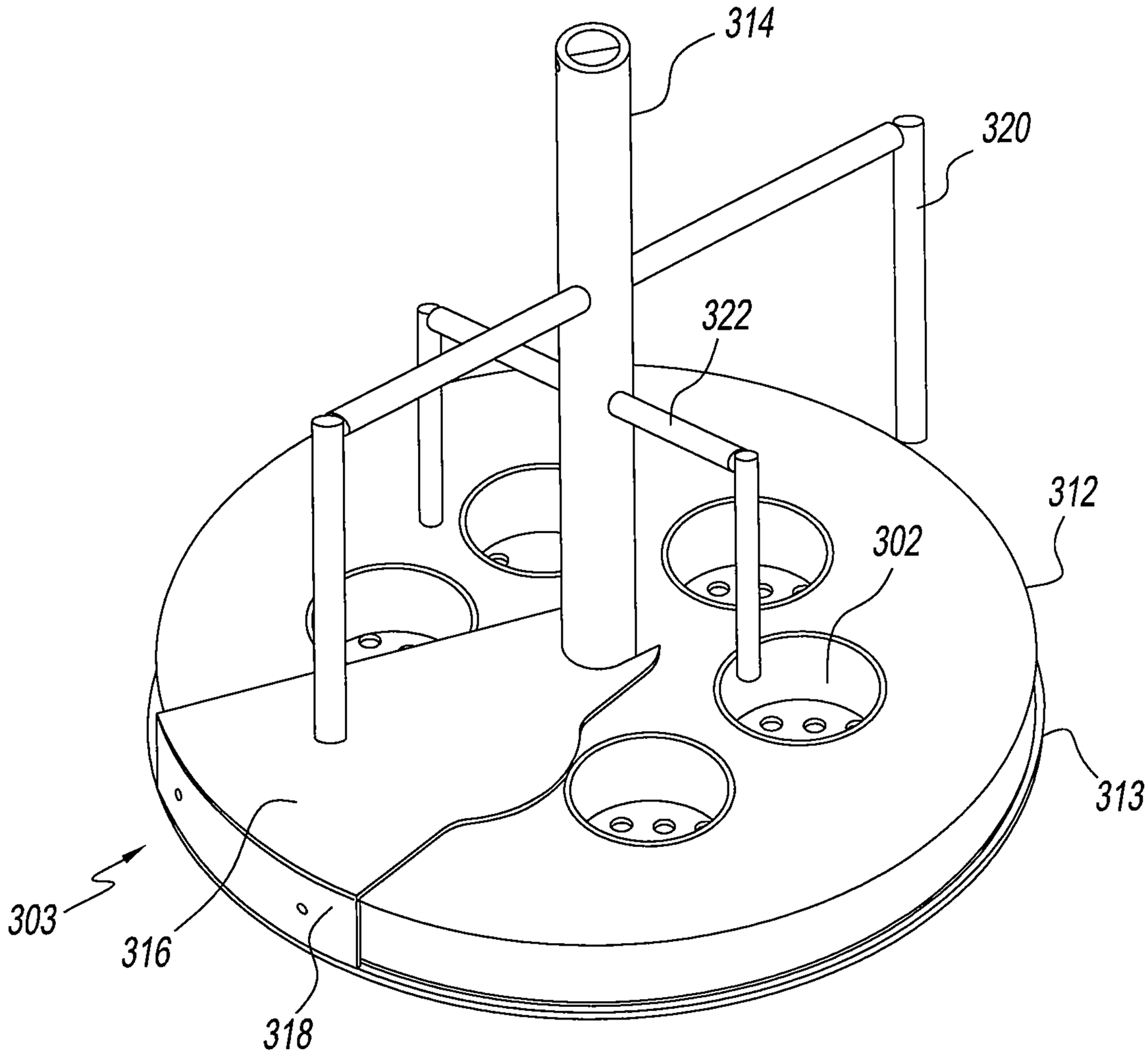


Fig. 20

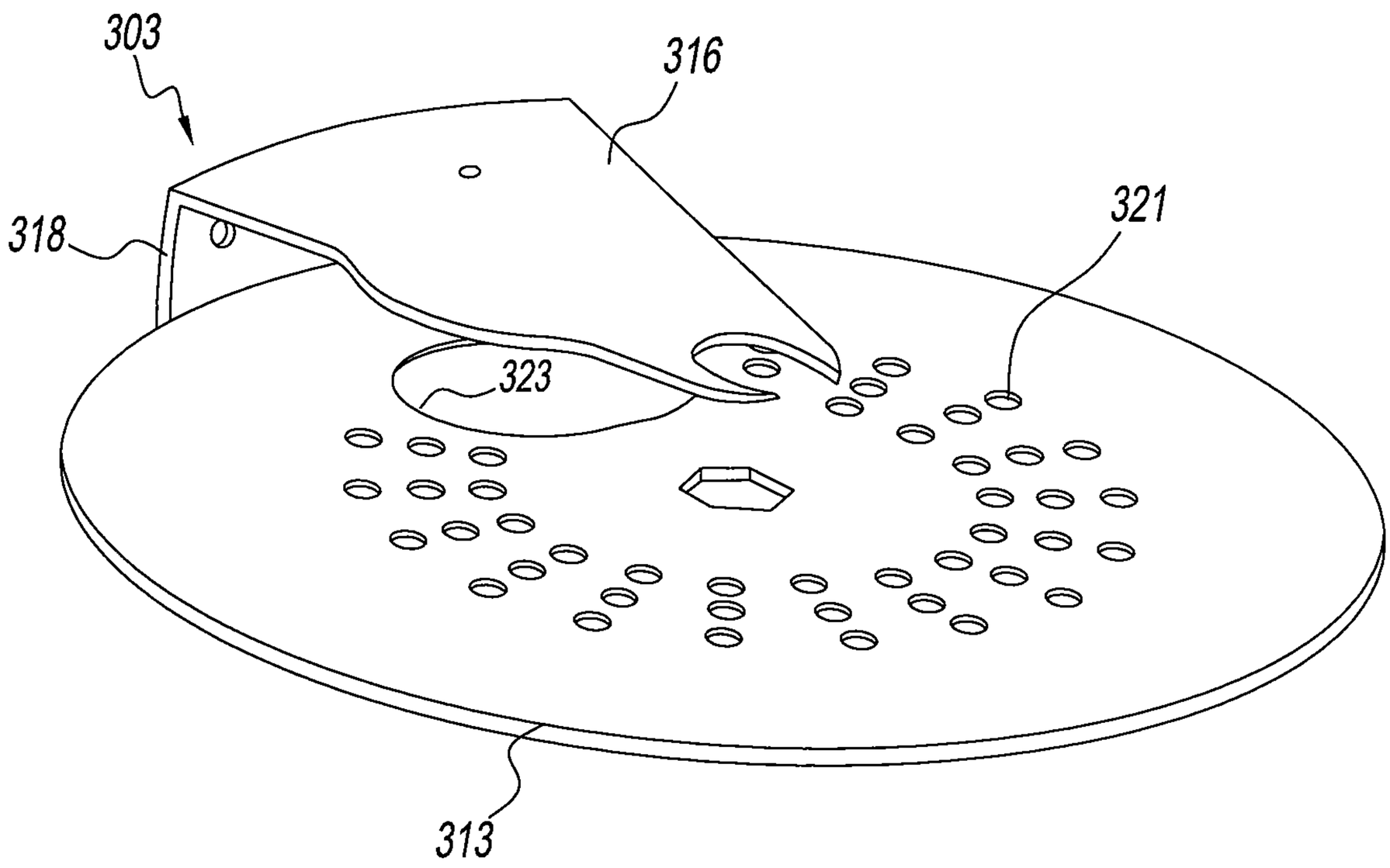


Fig. 21

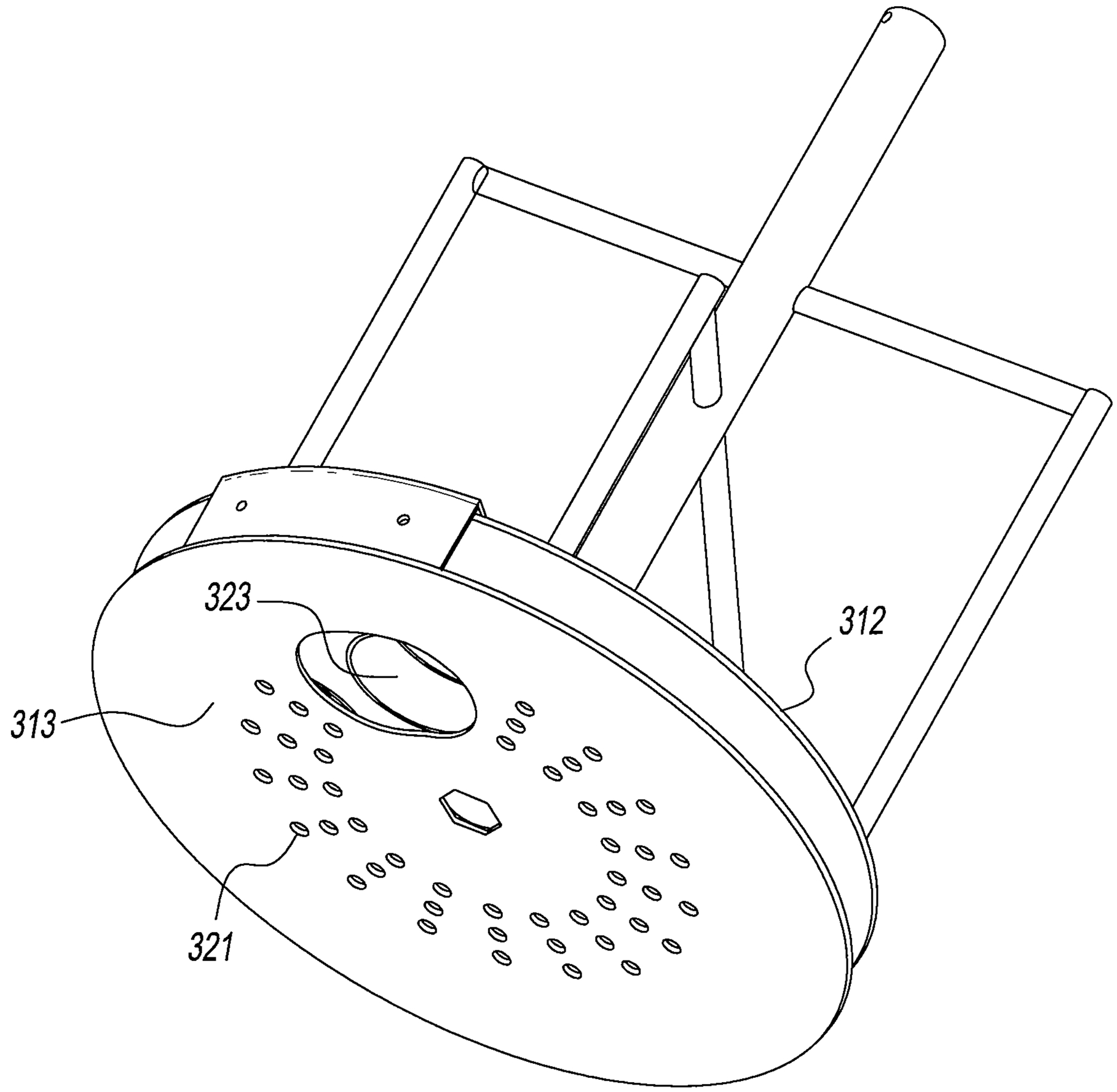


Fig. 22

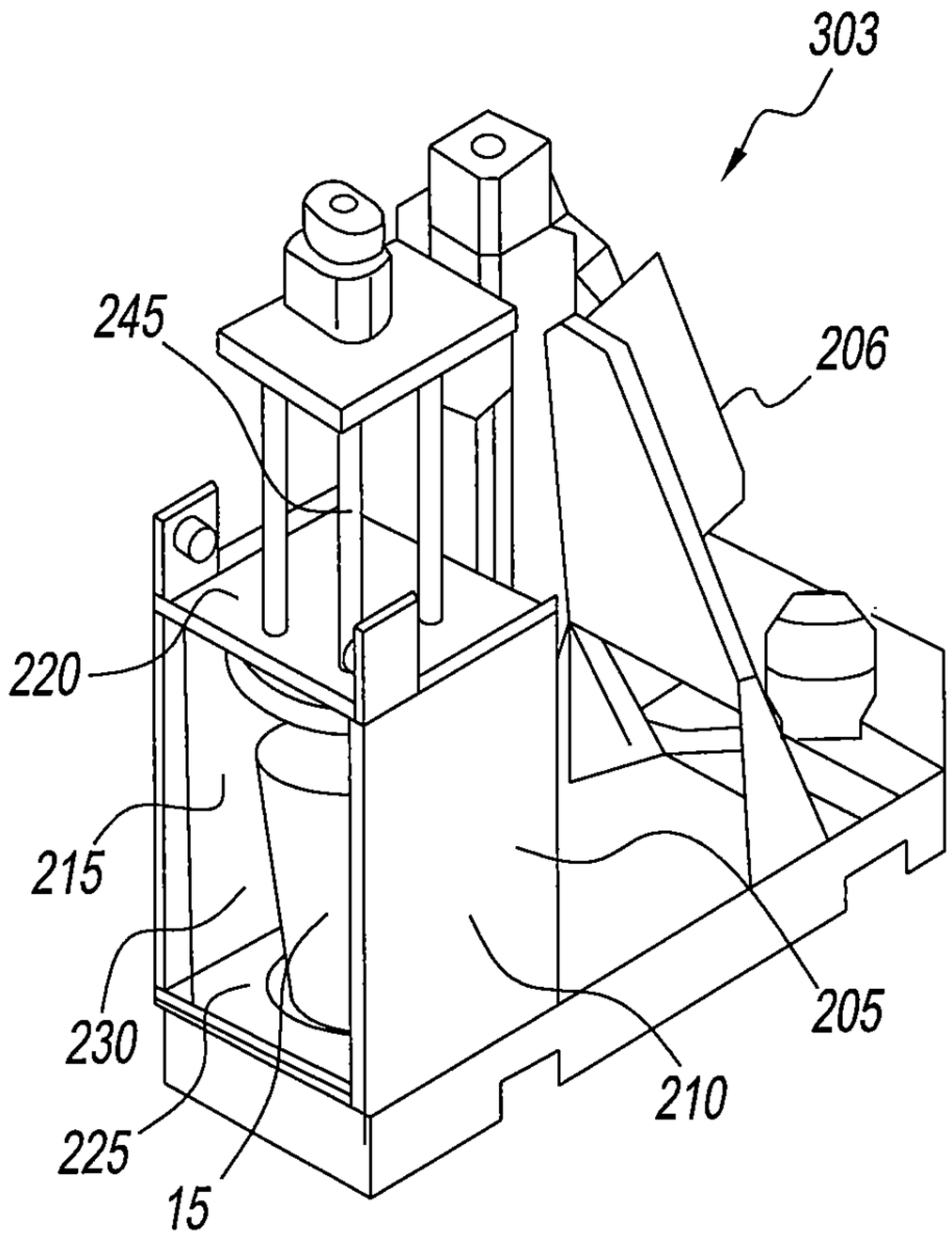


Fig. 23

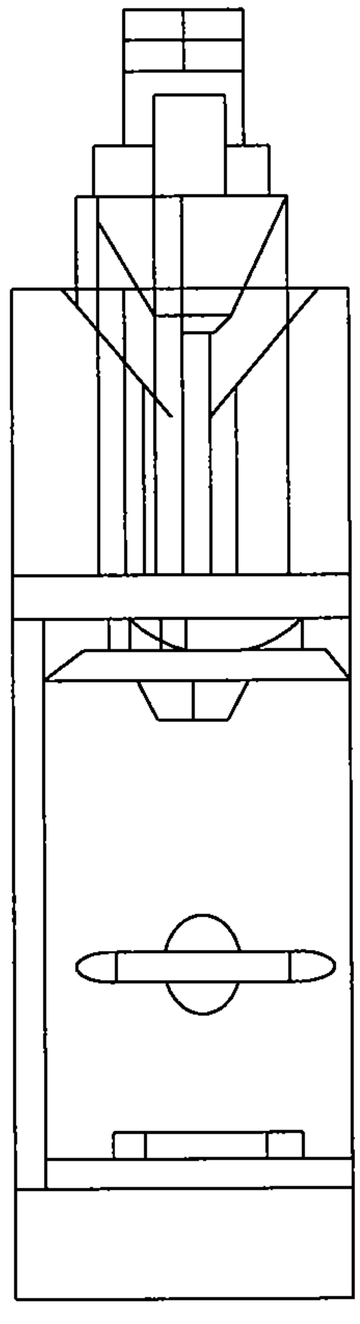
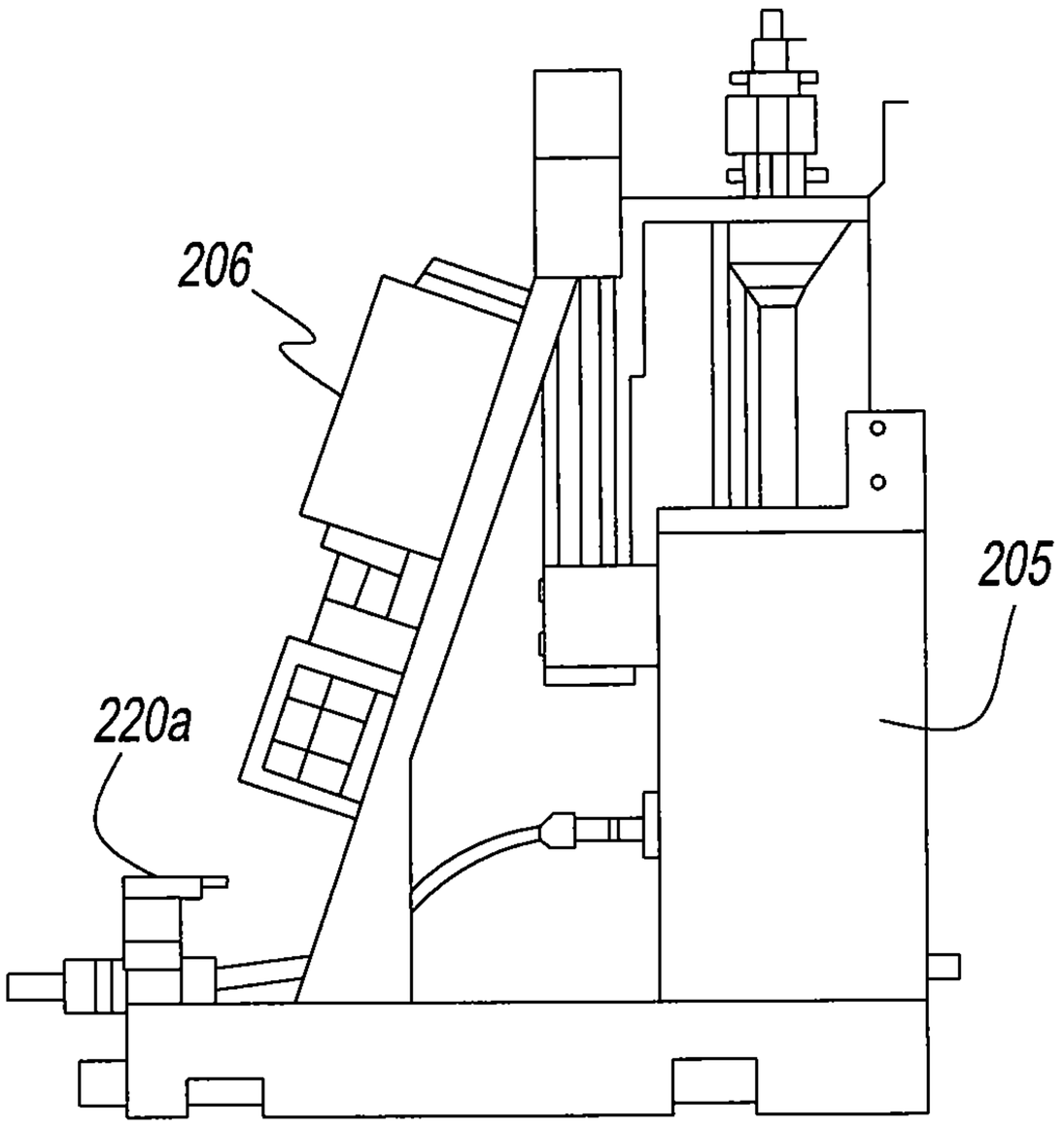


Fig. 25



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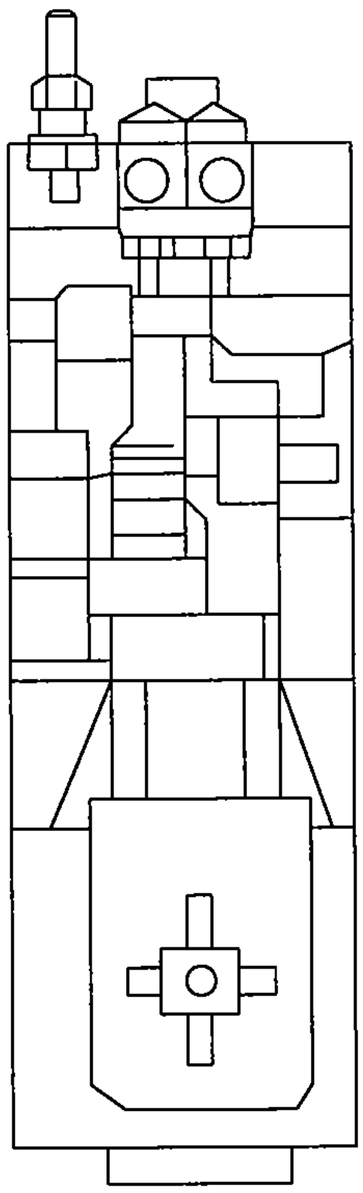

Fig. 26

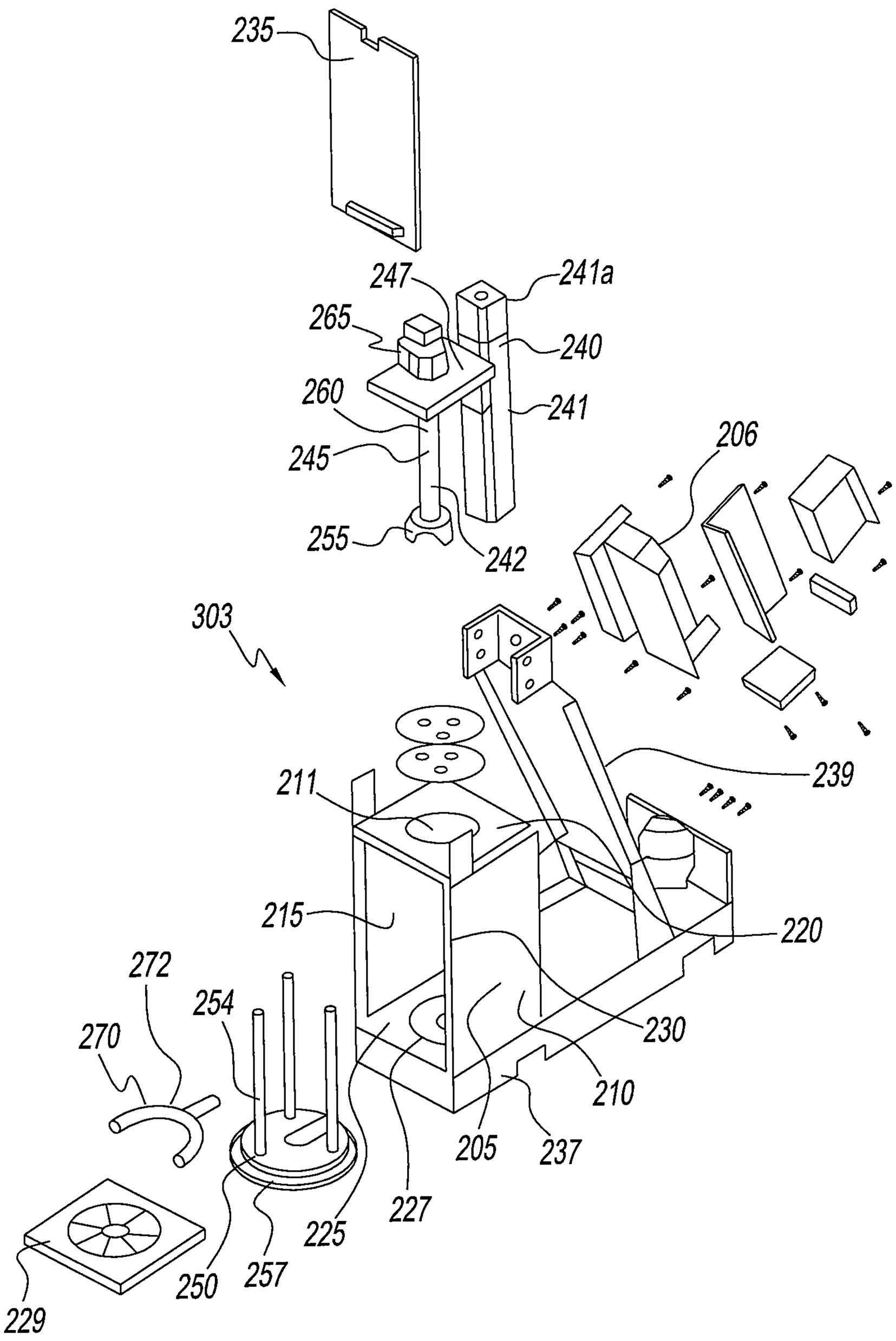
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Fig. 27

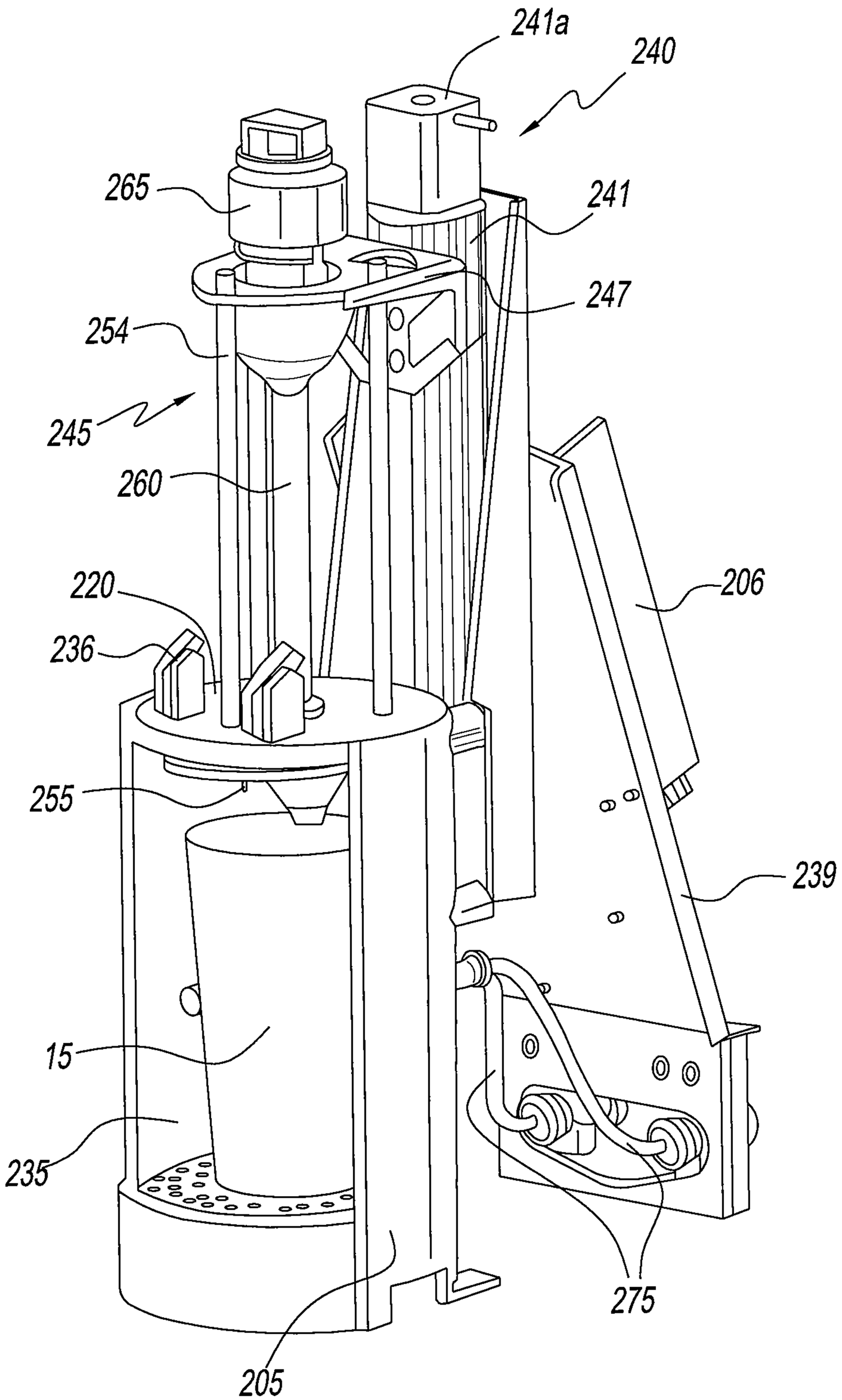
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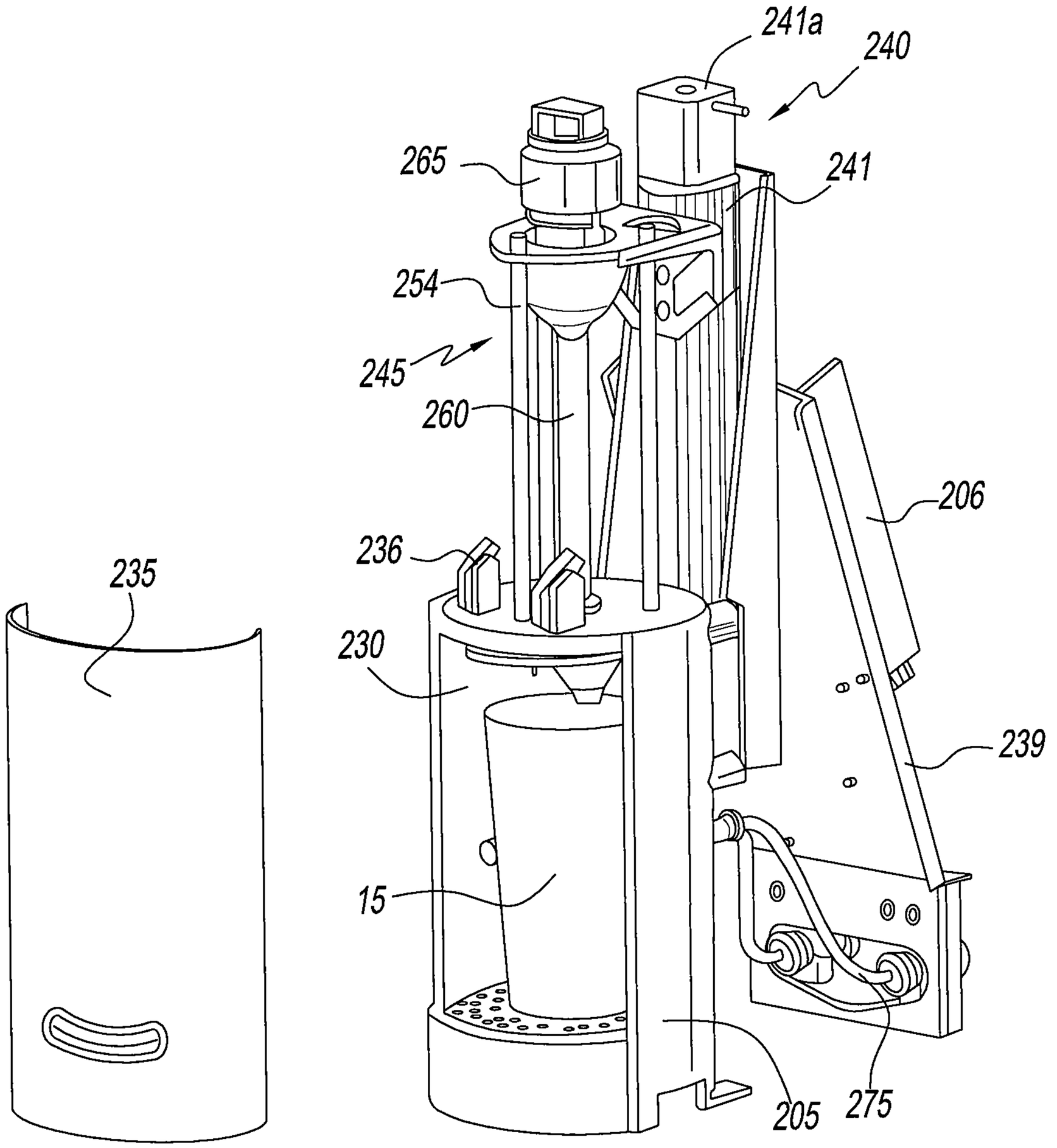
Fig. 28



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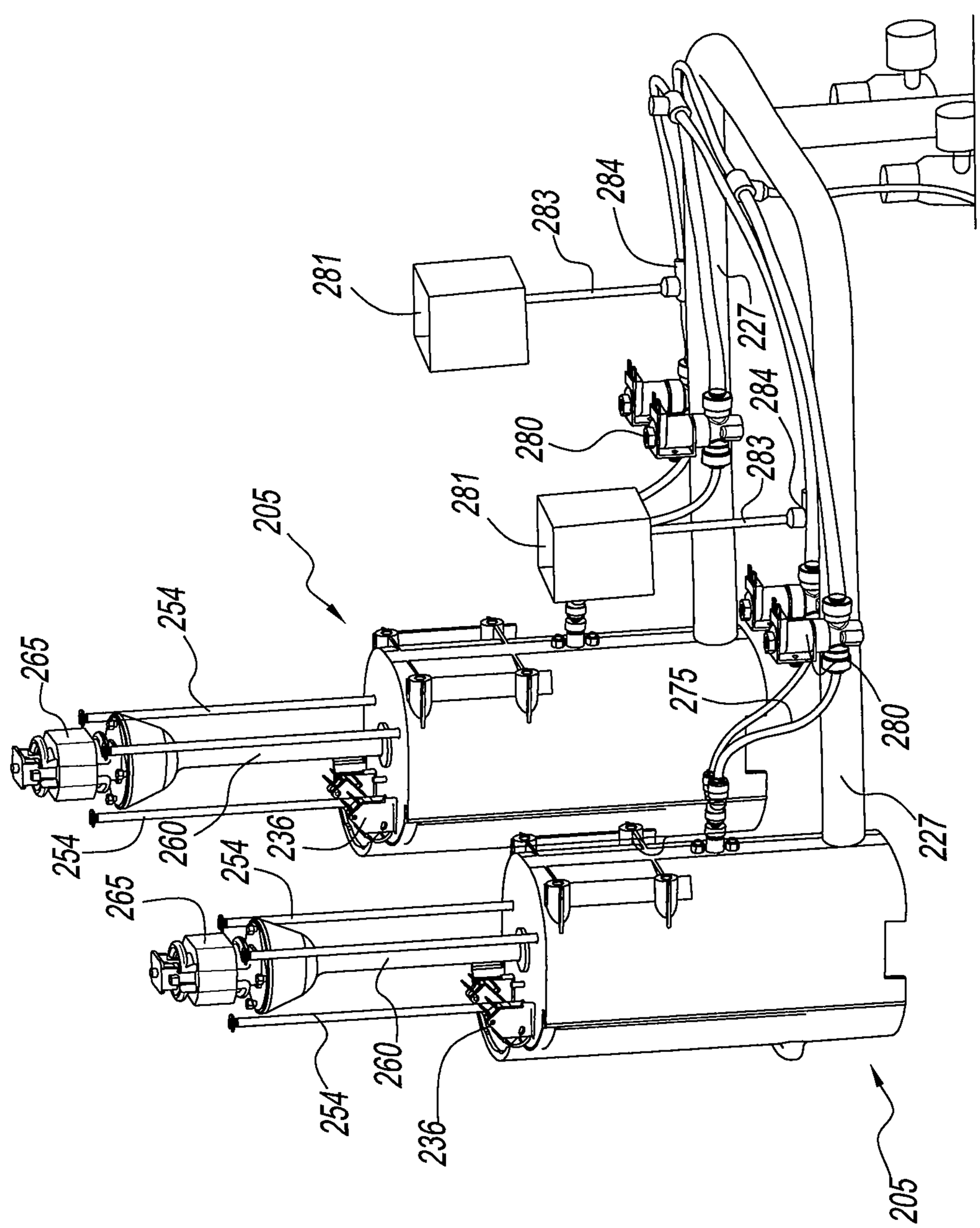
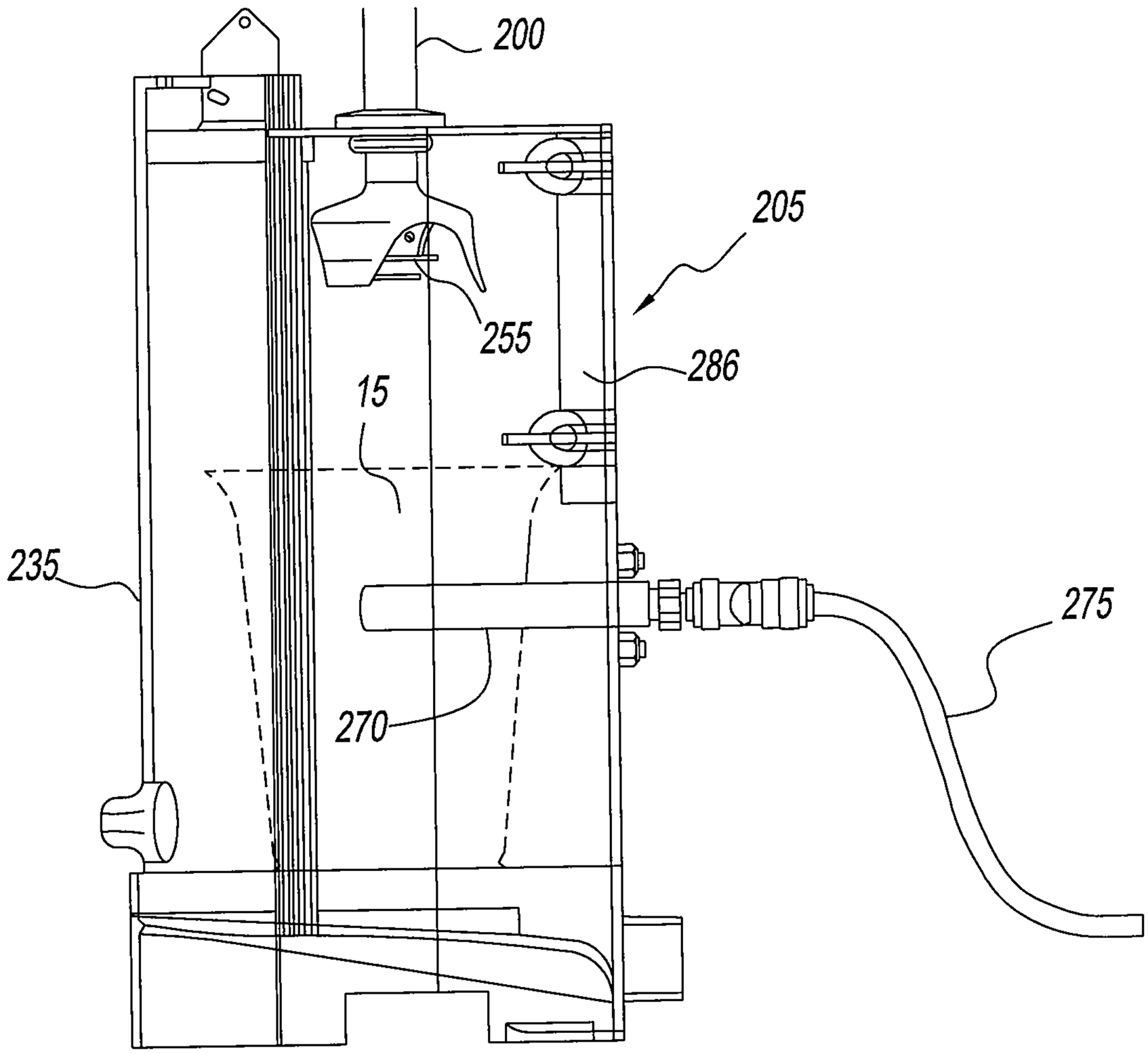


Fig. 30



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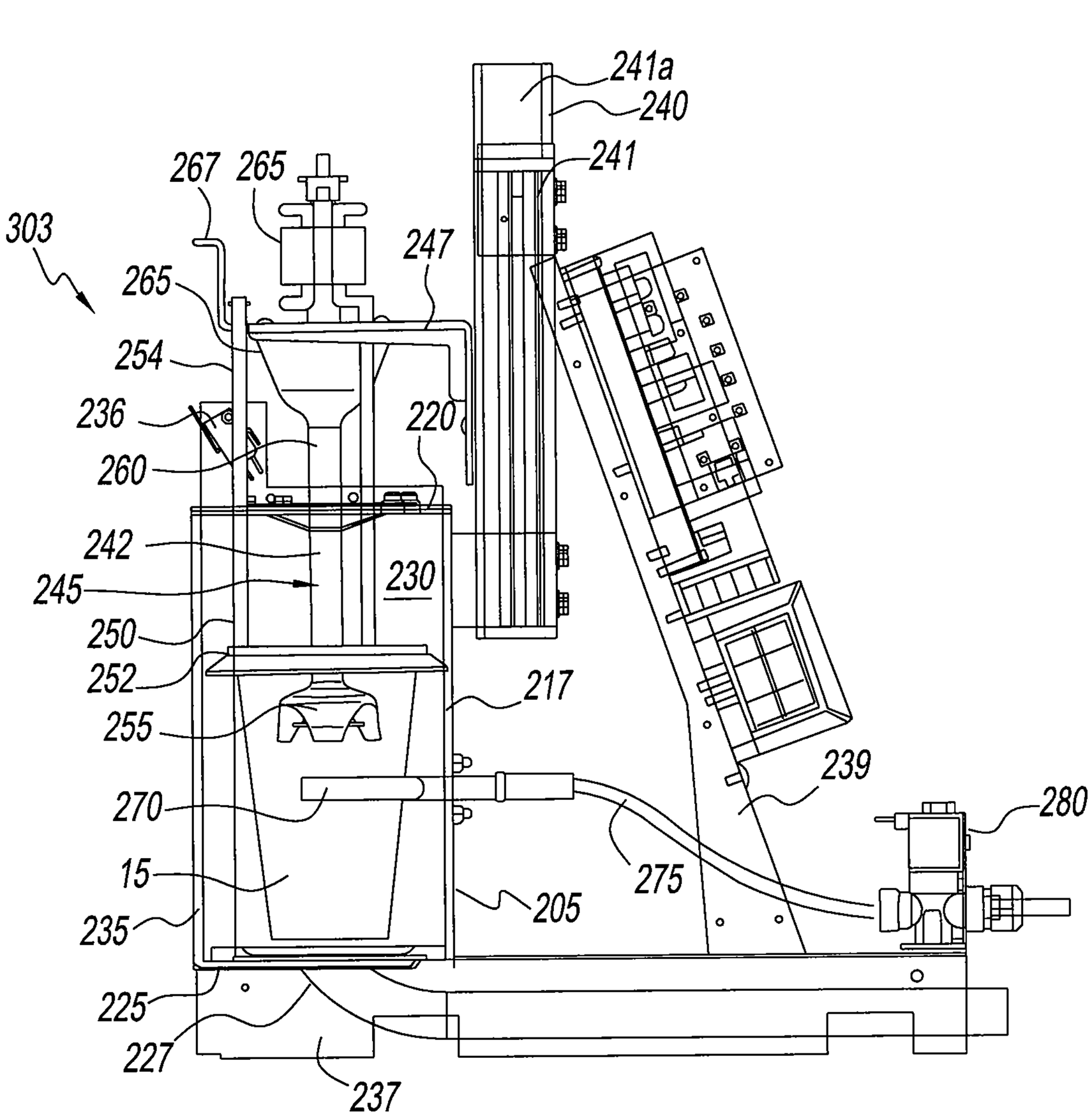
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Fig. 32

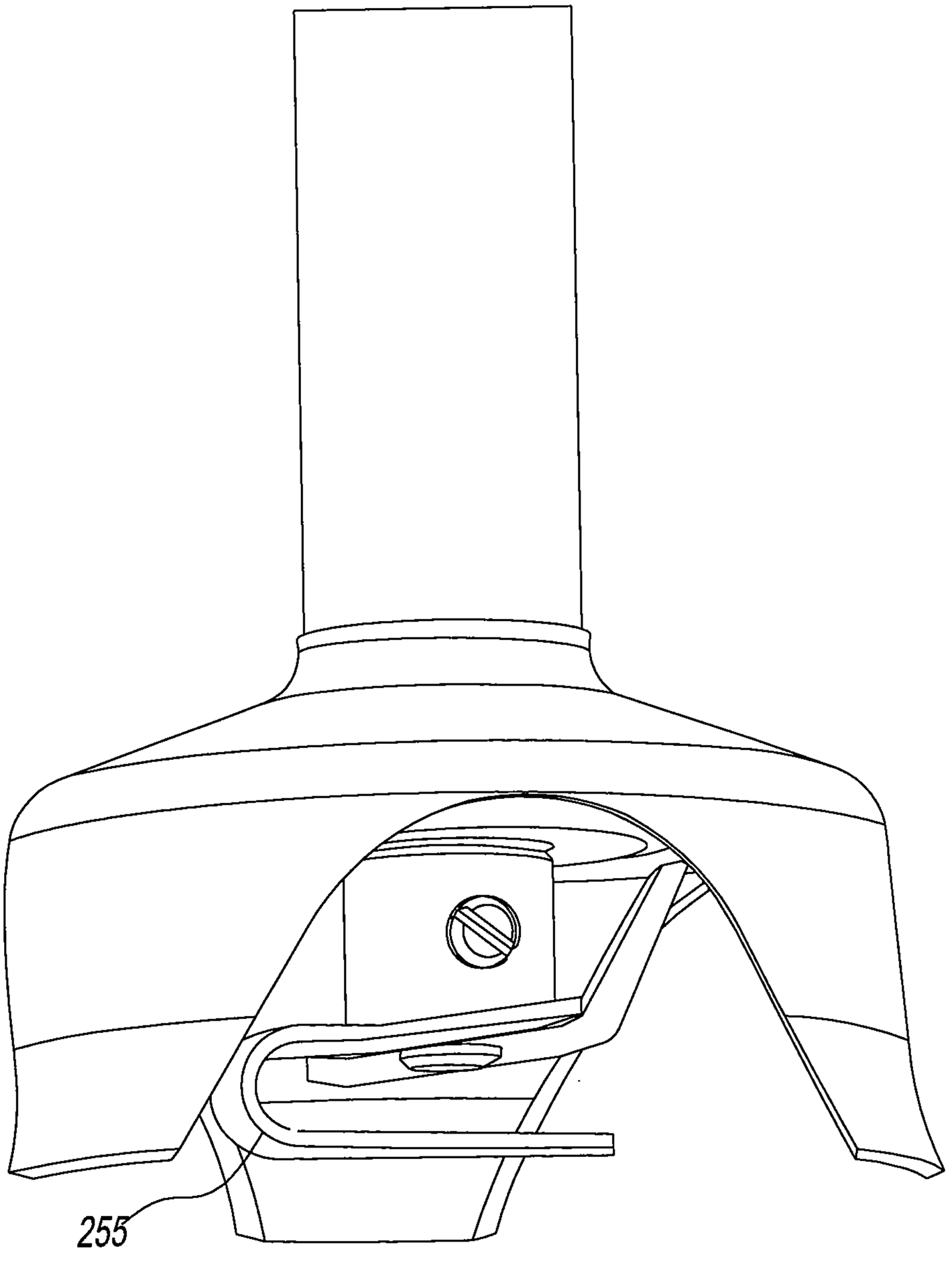


Fig. 33

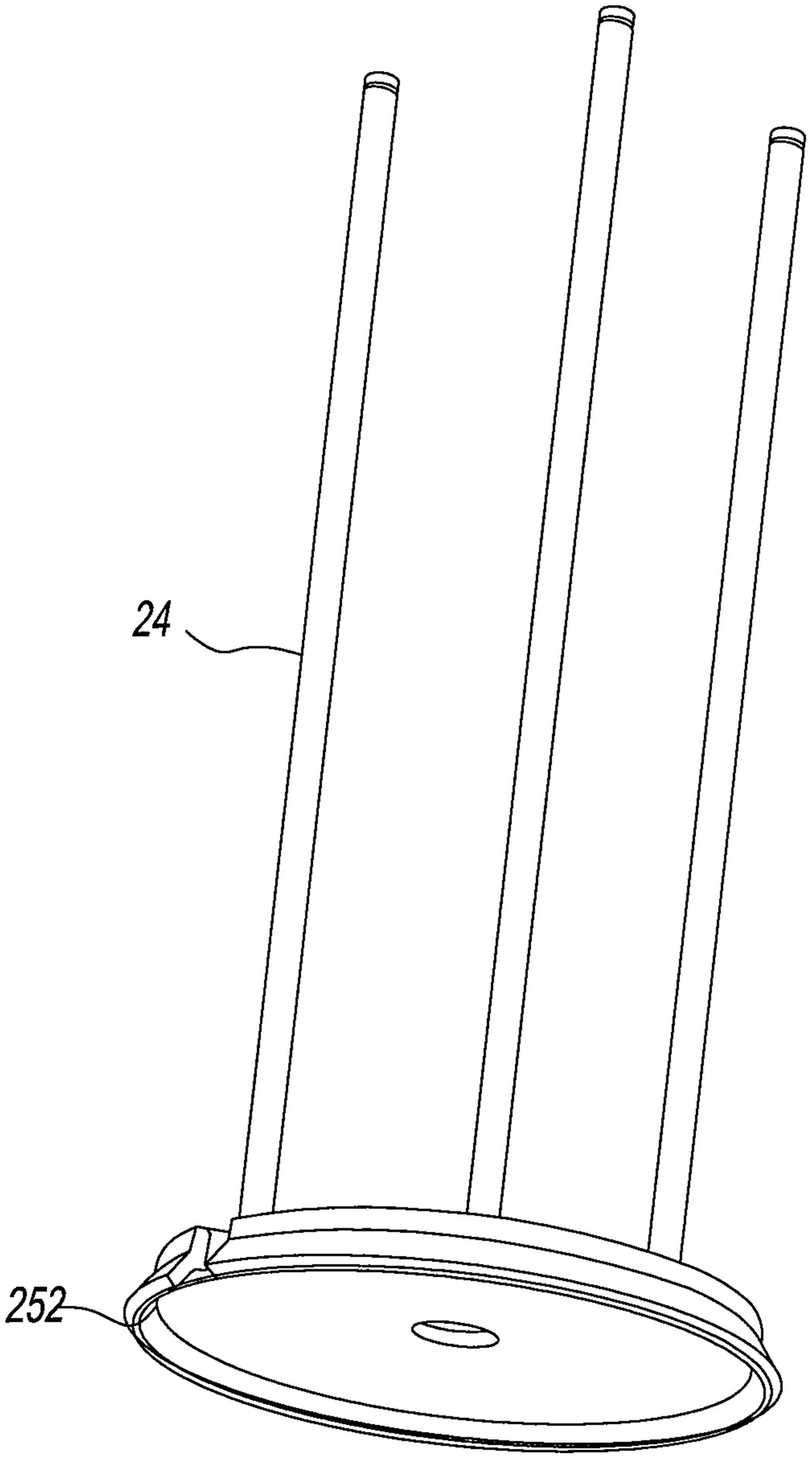
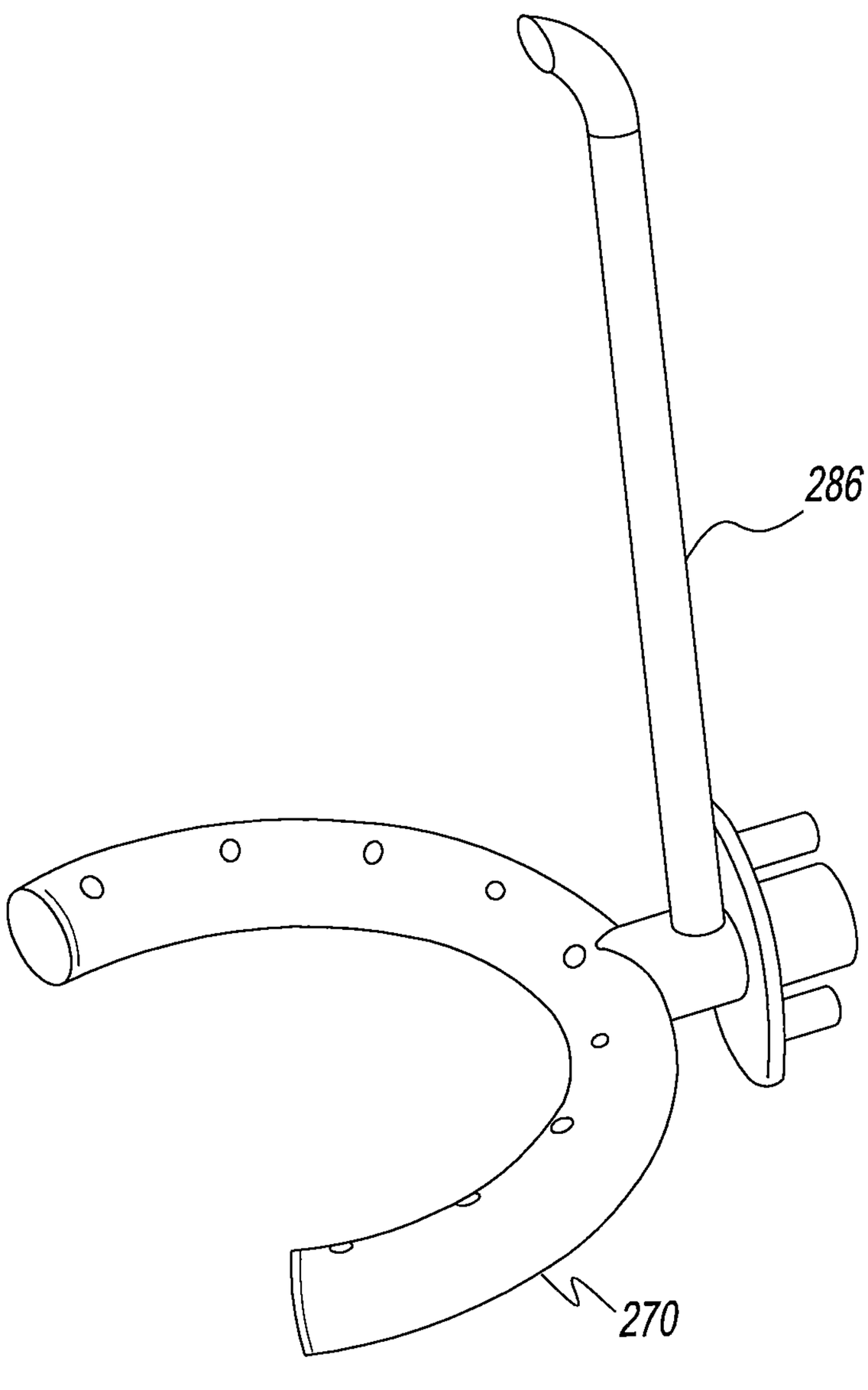


Fig. 34



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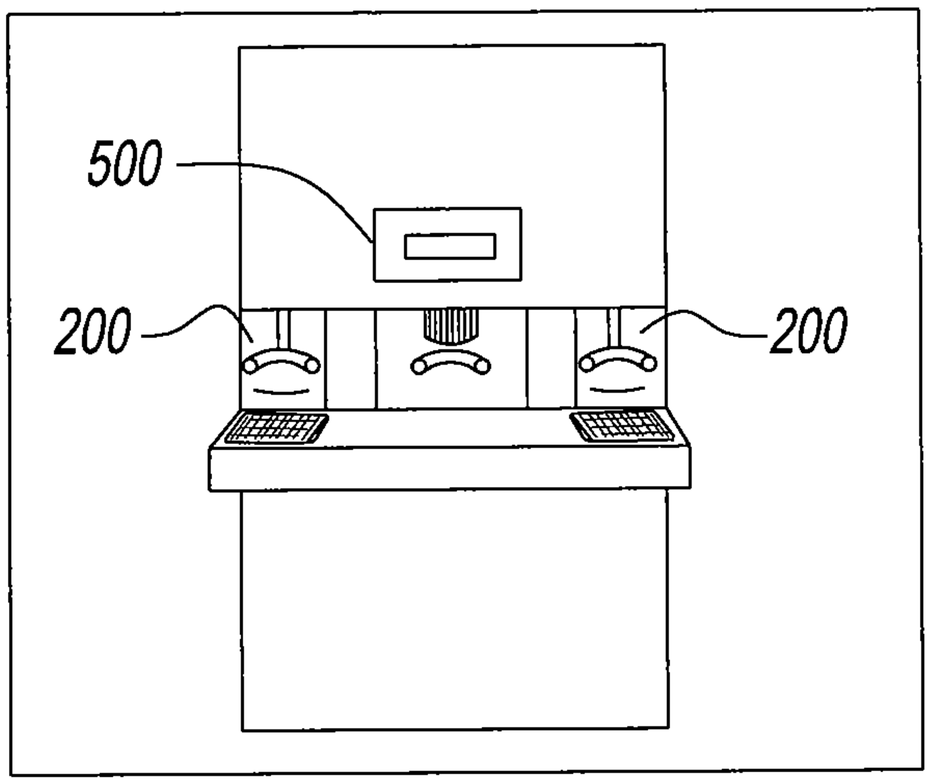
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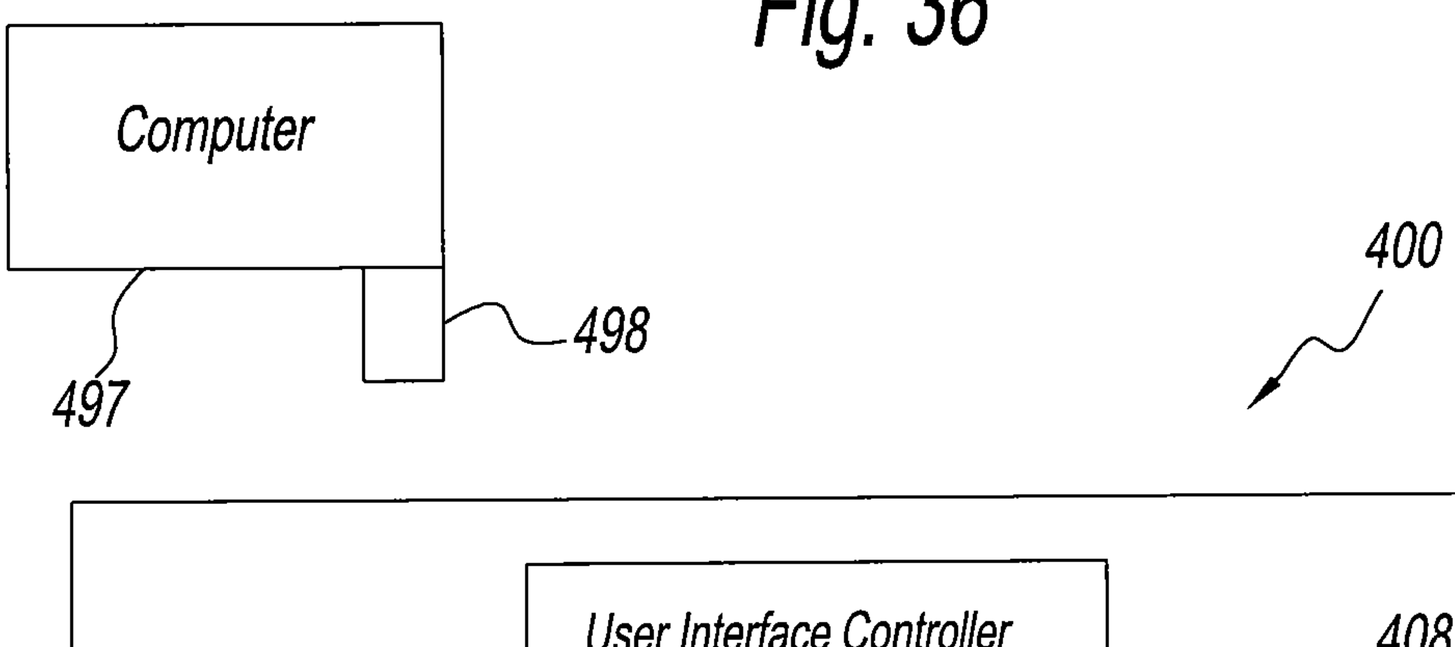
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Mixer Board
P-Bus
Mixer Board
System Relay Board
(SRB)
403
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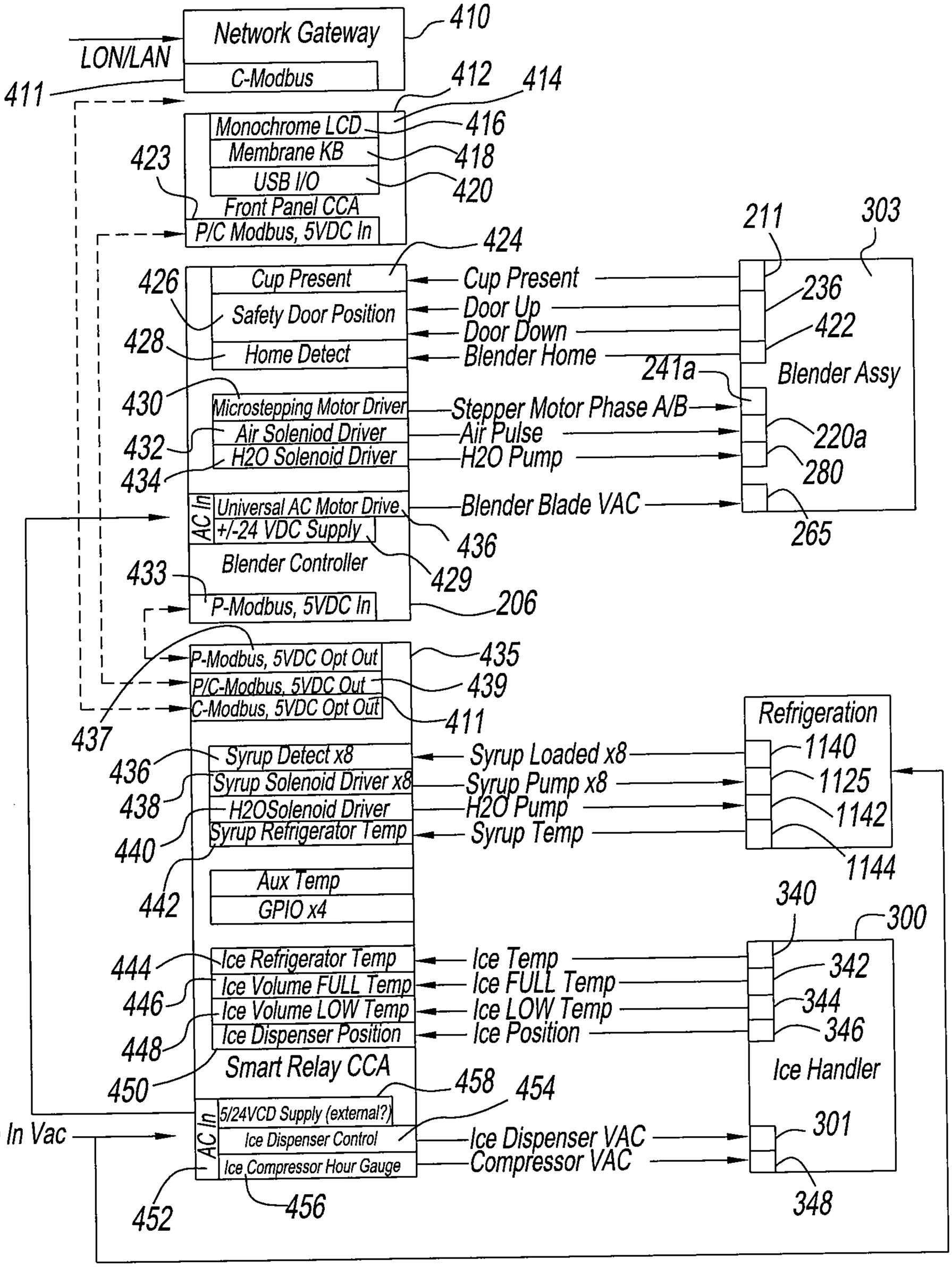
Fig. 37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424
Cup Present
Safety Door Position
Home Detect
426
428
Microstepping Motor Driver
Air Soleniod Driver
H2O Solenoid Driver
430
432
434
AC In
Universal AC Motor Drive
+/-24 VDC Supply
436
429
Blender Controller
433
P-Modbus, 5VDC In
206
P-Modbus, 5VDC Opt Out
P/C-Modbus, 5VDC Out
C-Modbus, 5VDC Opt Out
435
439
411
437
Syrup Detect x8
Syrup Solenoid Driver x8
H2OSolenoid Driver
Syrup Refrigerator Temp
436
438
440
442
Aux Temp
GPIO x4
Ice Refrigerator Temp
Ice Volume FULL Temp
Ice Volume LOW Temp
Ice Dispenser Position
Smart Relay CCA
444
446
448
450
458
454
AC In
5/24VCD Supply (external?)
Ice Dispenser Control
Ice Compressor Hour Gauge
Line In Vac
452
456
Cup Present
Door Up
Door Down
Blender Home
Stepper Motor Phase A/B
Air Pulse
H2O Pump
Blender Blade VAC
Syrup Loaded x8
Syrup Pump x8
H2O Pump
Syrup Temp
Ice Temp
Ice FULL Temp
Ice LOW Temp
Ice Position
Ice Dispenser VAC
Compressor VAC
211
303
236
422
241a
220a
280
265
Blender Assy
Refrigeration
1140
1125
1142
1144
340
300
342
344
346
Ice Handler
301
348

Fig. 38

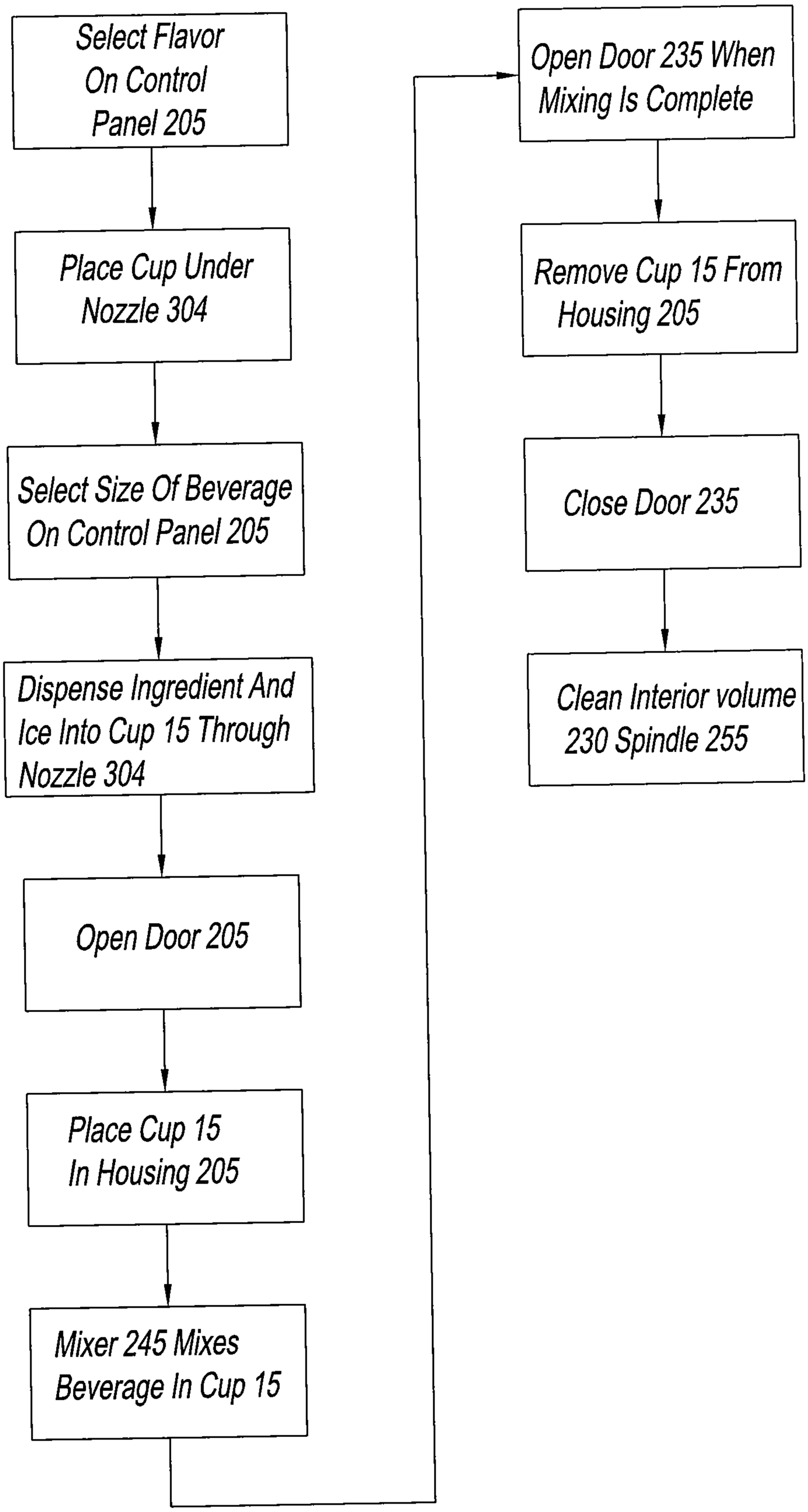

Select Flavor On Control Panel 205
Place Cup Under Nozzle 304
Select Size Of Beverage On Control Panel 205
Dispense Ingredient And Ice Into Cup 15 Through Nozzle 304
Open Door 205
Place Cup 15 In Housing 205
Mixer 245 Mixes Beverage In Cup 15
Open Door 235 When Mixing Is Complete
Remove Cup 15 From Housing 205
Close Door 235
Clean Interior volume 230 Spindle 255

Fig. 39

SUBSTITUTE SHEET (RULE 26)

Product Mode

	Idle -				
Display/Function	1. Computer displays "Select Up to 3 Flavors" 2. Computer displays up to 7 flavors (configurable) selections located in line with selection soft key and a "Water Only" and "ICE Only" selection located above the right most bottom soft keys respectively.				
Button		Press 1-3 flavors OR Ice Only soft keys not cannot select both Ice Only and flavors	Press X to go to system setup	Press check without flavor selections	Pression more than 3 flavors
Display/Function		Display highlights the flavors selected	Display un-highlight selections	Display does not change (stay in Idle)	Display reverse videos the first 3 and does not change unless the same item is selected in which case will toggle to un-select.
Botton	Press X to clear selections	Press check to select			
Dixplay/Function	—	1. Computer displays "Additives and Cup Size" 2. Computer displays "Flavor: sel1, and sel3" below where sel1 - sel3 are the flavors previously selected. 3. Computer displays three additives available for selection below the top soft keys including Yogurt on the right top key. Note Computer displays additives crossed out if currently unavailable. 4. Computer displays four cup size selections "Small" above the bottom left key, "Medium" above the center bottom key, "Large" and "XLarge" above the bottom right most keys respectively.	—	—	—

Fig. 40

			Product Mode					
Button	—	*Press X to go to previous Display*	*1. Place cup under dispenser* *2. If additive desired 1st select up to three additives* *3. Press soft key under Small, Medium, Large, or XLarge - this starts the dispensing!*	*Check is disabled*	—	—	—	—
Display/Function	—	—	*Computer starts dispensing product and Computer displays "Dispensing" with display of cup size, flavors, and additives selected for duration of dispense cycle.*			—	—	—
Botton	—	—	*X goes back to Idle and stop dispensing*		—	—	—	—
Dixplay/Function	—	—	*1. Computer displays "Select Mixer" and "left" under the left most top soft key and "Right" under the right most top soft key for a two dispenser unit.* *2. Computer will display "LEFTL" and "RIGHTL" and "RIGHTR" under the two right most soft keys if this system is configured with four dispenser modules.* *3. If any of the mixers are busy or not functional the computer will display the appropriate left or right text crossed out.*		—	—	—	—
Botton	—	—	*Press X to go back to Idle, Check is disabled*	*1.Press Soft key above available mixer (not crossed out), then computer goes back to idle display.* *2. Open blender door.* *3. Place cup and close door* *4. Computer starts blending with door closure.* *5. Blending completes (no beep?) then user removes cup and door should close to allow cleaning cycle.*	—	—	—	—

Fig. 41

SUBSTITUTE SHEET (RULE 26)

SUBSTITUTE SHEET (RULE 26)

System Setup Mode									
Botton	From Idle Press X								
Display/Function	Computer displays "System Setup" with "DISP. Setup", "LOAD Fluids", and "Service" displayed under the the top left, center and right soft keys.								
Botton	Press appropriate soft key (DISP Setup, LOAD FLUIDS, or Service) Note other soft keys are disabled							Press X to go back to Idle Mode	Check disabled ?
Display/Function	If DISP Setup was selected then the Computer displays "Brightness" on the left and "Contrast" on the right with + and - symbols on each side above and below the associated soft keys.		If LOAD Fliuds was selected then the Computer displays "Load Fluids" with "Slot 1", "Slot 2", "Slot 3", "Slot 4", and "Slot 5" across the top of the display respectively and "Slot 6" and "Slot 7" across the bottom left of the display respectively.		If Service was selected then the Computer displays "Status", "Calibrate", "Maint".			—	—
Botton	Press X or Check to go back to Setup screen	Press appropriate soft keys to modify brightness and Contrast	Press one of the slot slections	Press X or Check to go back to Setup screen	If Status pressed	If Calibrate is pressed	If Maint. Pressed	—	—
Display/Function	—	Press X or Check to go back to service screen?	1. Computer displays "Assign Fluid Slot X" on the left side of the display where x is the slot number selected previously. 2. Computer displays list of up to 255? Fluid selections with current fluid highlighted with up down arrows under the top and bottom right most soft keys respectively.	—	Computer displays? 1. Temp sensor Values. 2. Error log. 3. # of cycles of each product. 4.	Fluid calibration needed?	1. Cleaning? 2. Dispensing cleaning fluid? 3. Cycle through modes for service testing?	—	—

Fig. 42a

System Setup Mode										
Botton	—	—	Scroll through product using soft keys and select highlighted fluid by pressing check, Soft keys disabled? Goes back to Load Fluids screen? Primes pump?	Press X to go back to Load Fluids screen	—	—	—	—	—	—

Language Botton	
Botton	Press language key at any time
Display/Function	Current display changes to a new language each time the button is pressed. When starting English the display changes to the languages and order below: 1. Spanish, 2. French, 4. Canadian, 5. German, 6. Swedish, 7. Portuguese, 8. Italian, 9. Chinese, 10. Japanese, 11. back to English

Fig. 42b

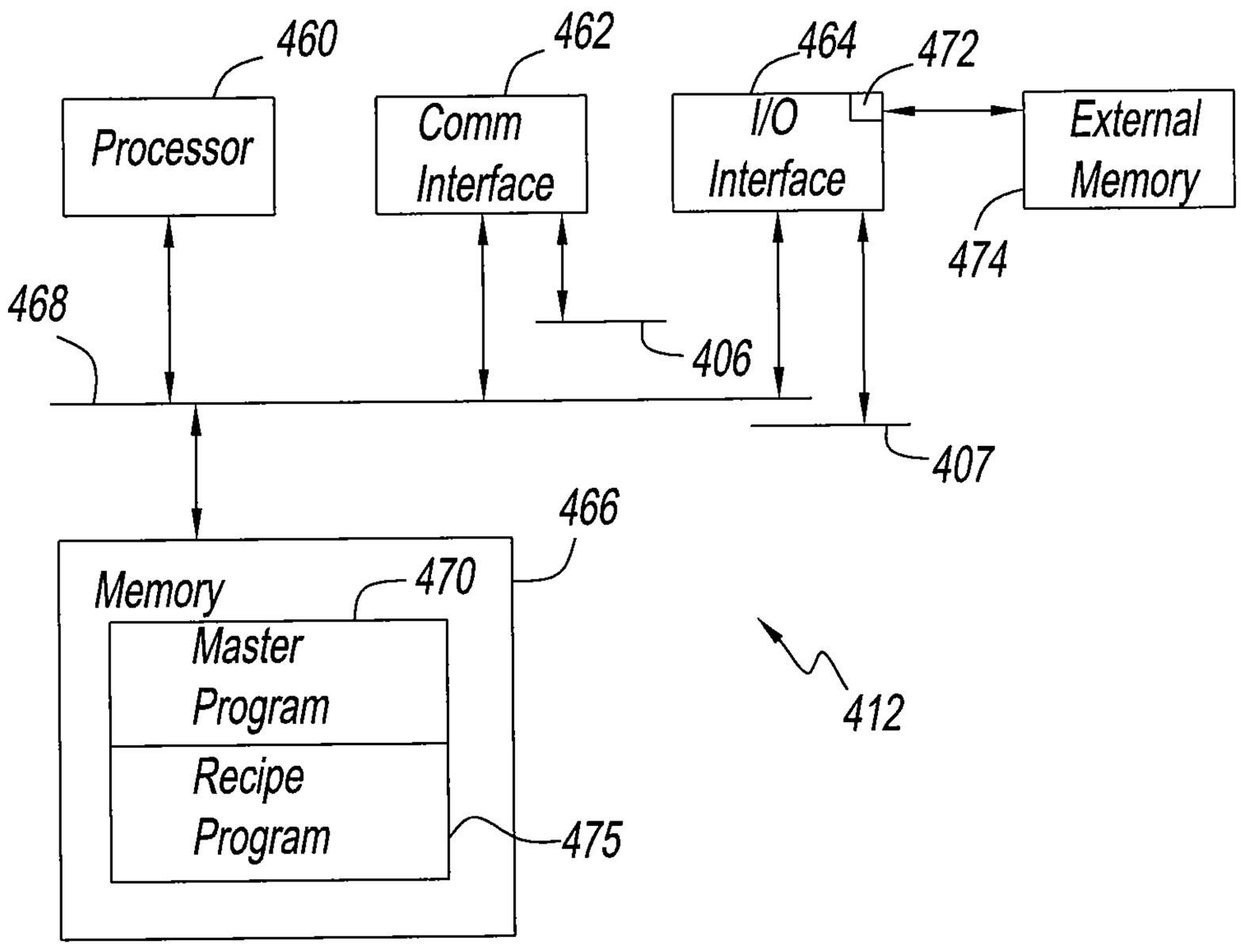

460
Processor
462
Comm Interface
464
I/O Interface
472
External Memory
474
468
406
407
466
Memory
470
Master Program
Recipe Program
475
412

Fig. 43

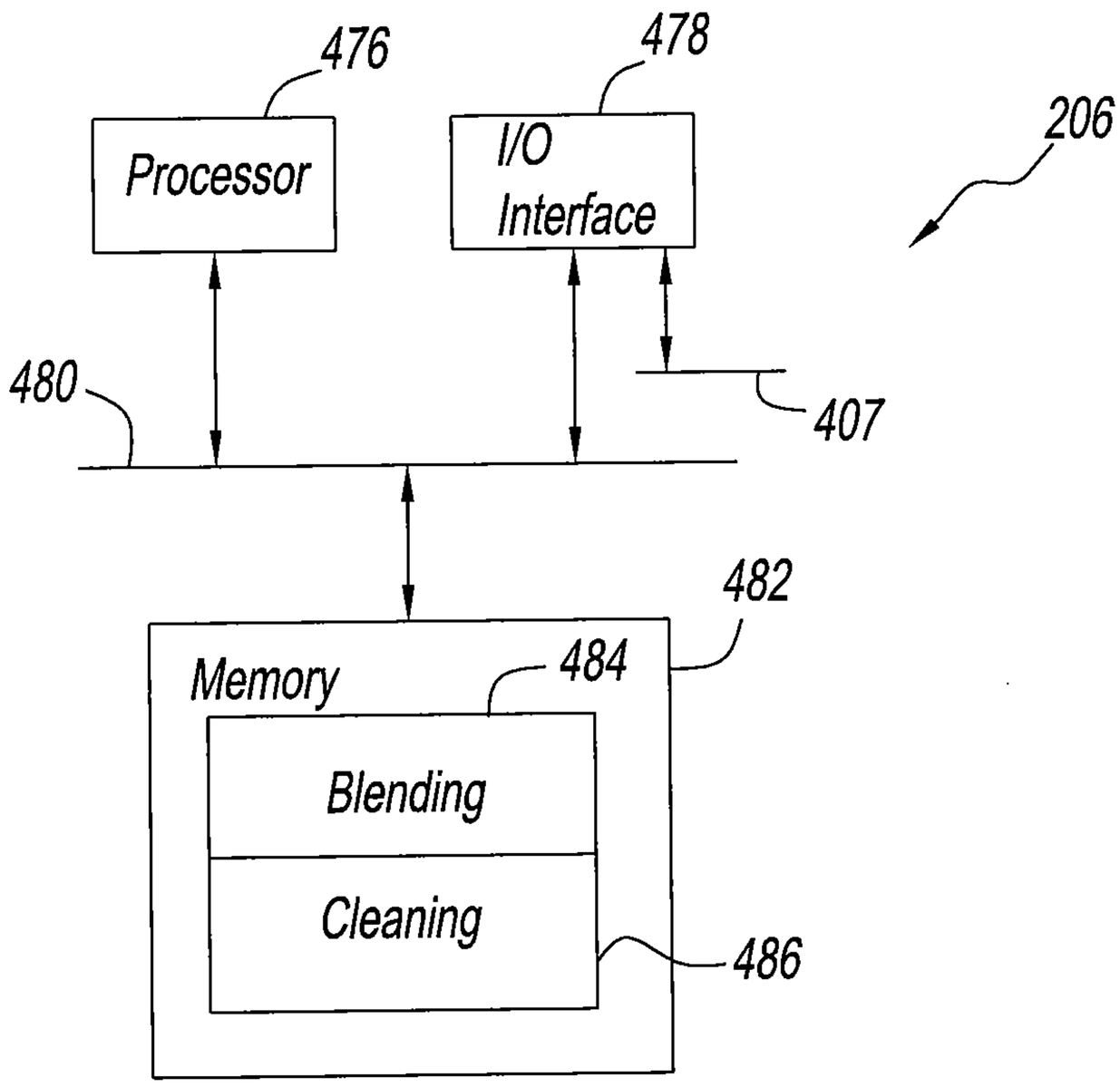

476
Processor
478
I/O Interface
206
480
407
482
Memory
484
Blending
Cleaning
486

Fig. 44

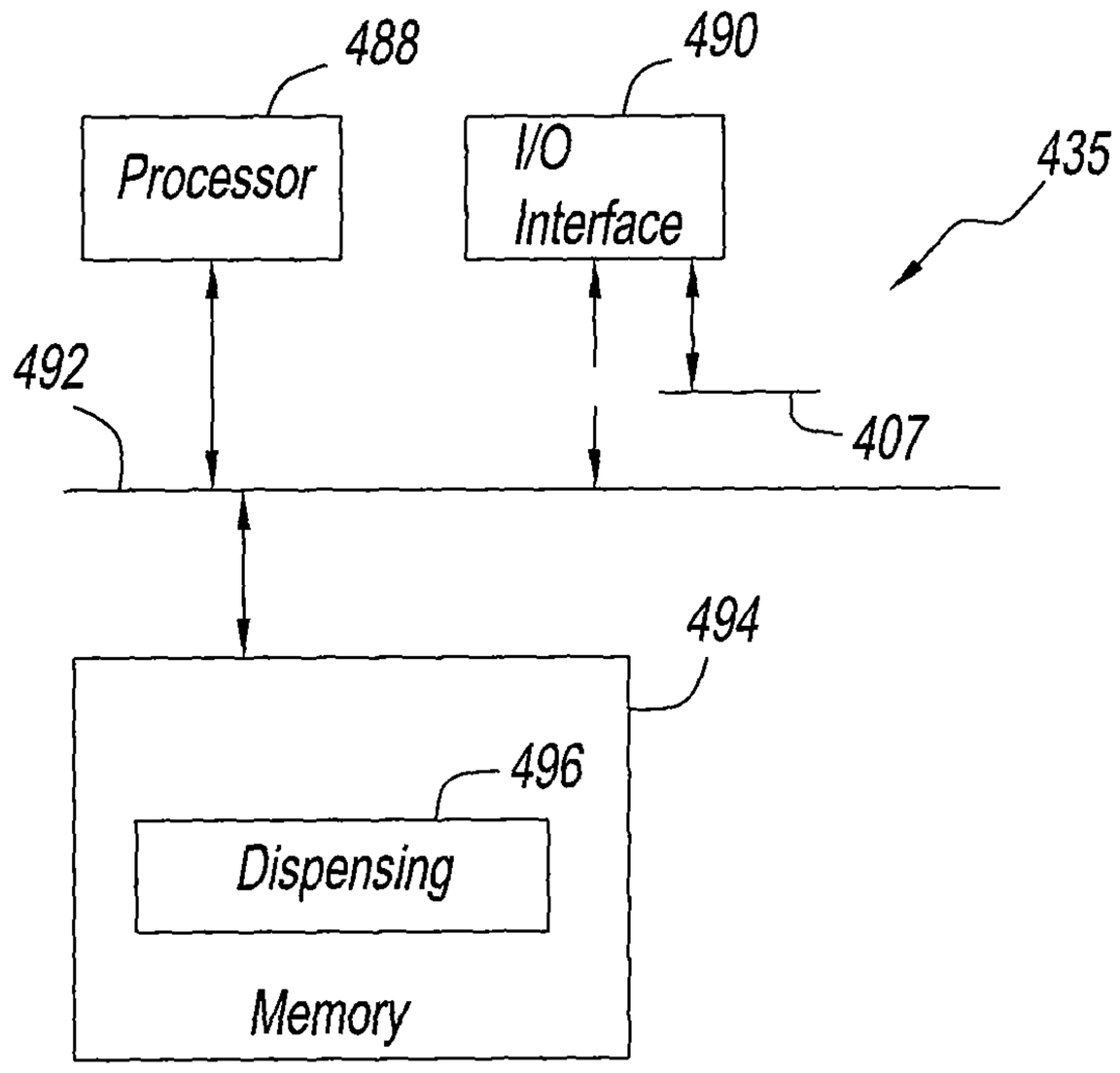

488
490
Processor
I/O
Interface
435
492
407
494
496
Dispensing
Memory

Fig. 45

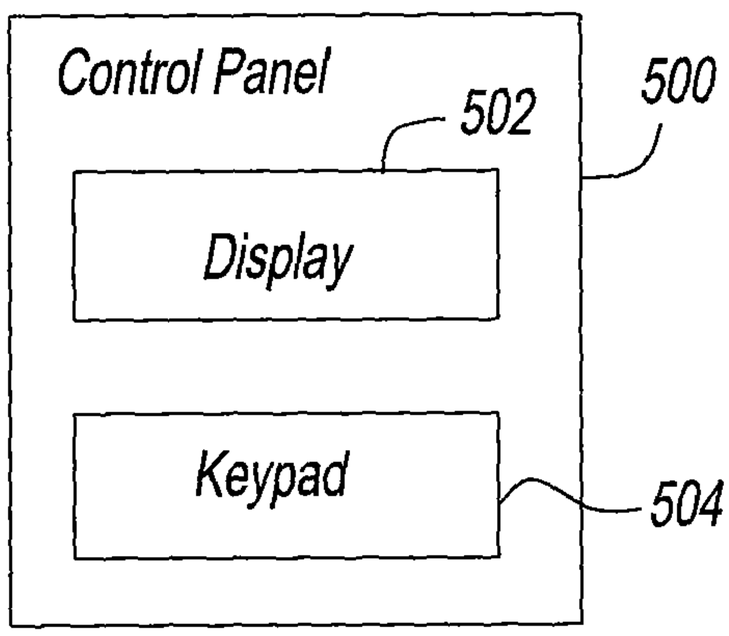

Control Panel
502
500
Display
Keypad
504

Fig. 46

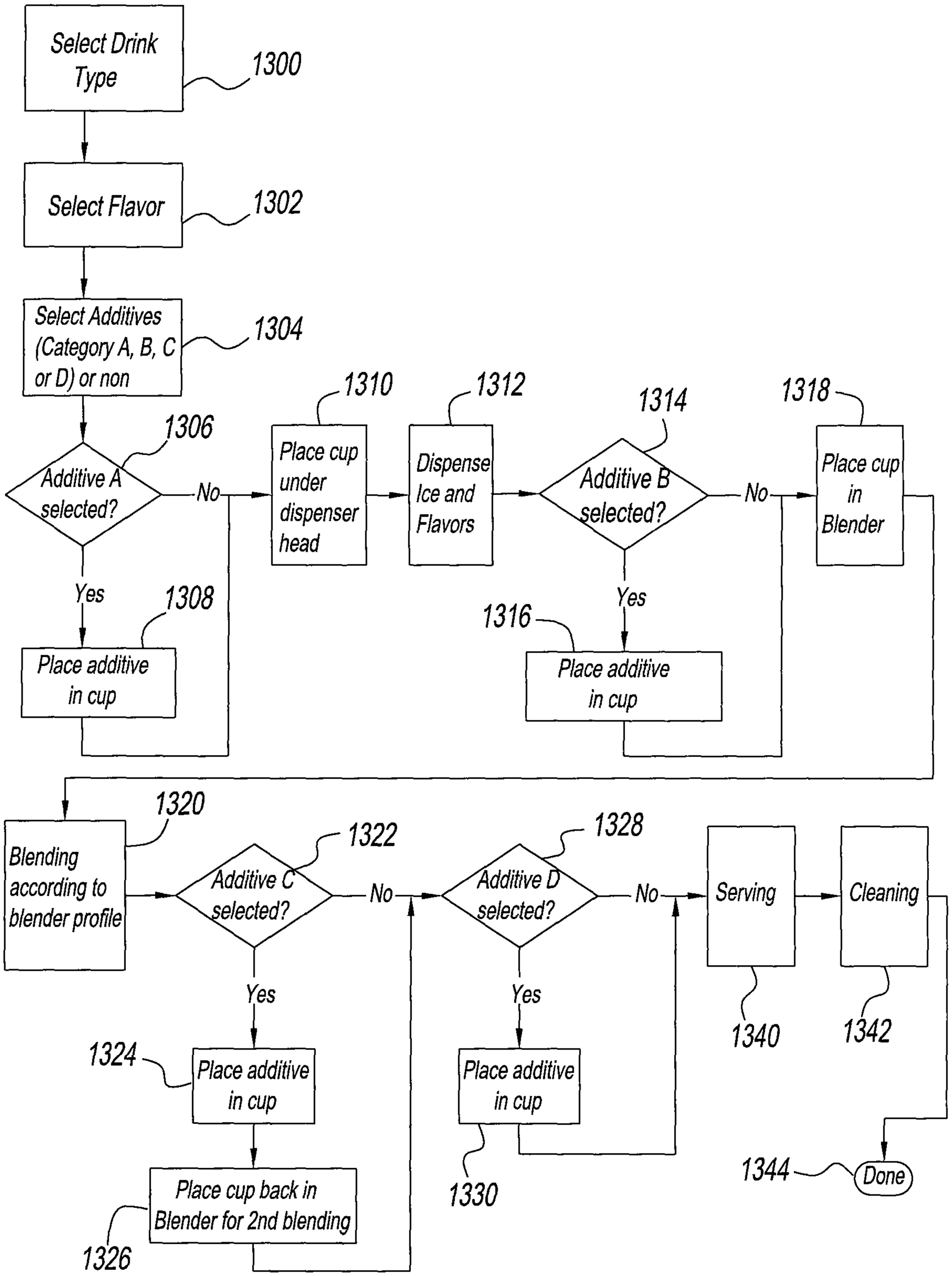

Select Drink Type
1300
Select Flavor
1302
Select Additives (Category A, B, C or D) or non
1304
Additive A selected?
1306
No
Yes
Place additive in cup
1308
Place cup under dispenser head
1310
Dispense Ice and Flavors
1312
Additive B selected?
1314
No
Yes
Place additive in cup
1316
Place cup in Blender
1318
Blending according to blender profile
1320
Additive C selected?
1322
No
Yes
Place additive in cup
1324
Place cup back in Blender for 2nd blending
1326
Additive D selected?
1328
No
Yes
Place additive in cup
1330
Serving
1340
Cleaning
1342
Done
1344

Fig. 47

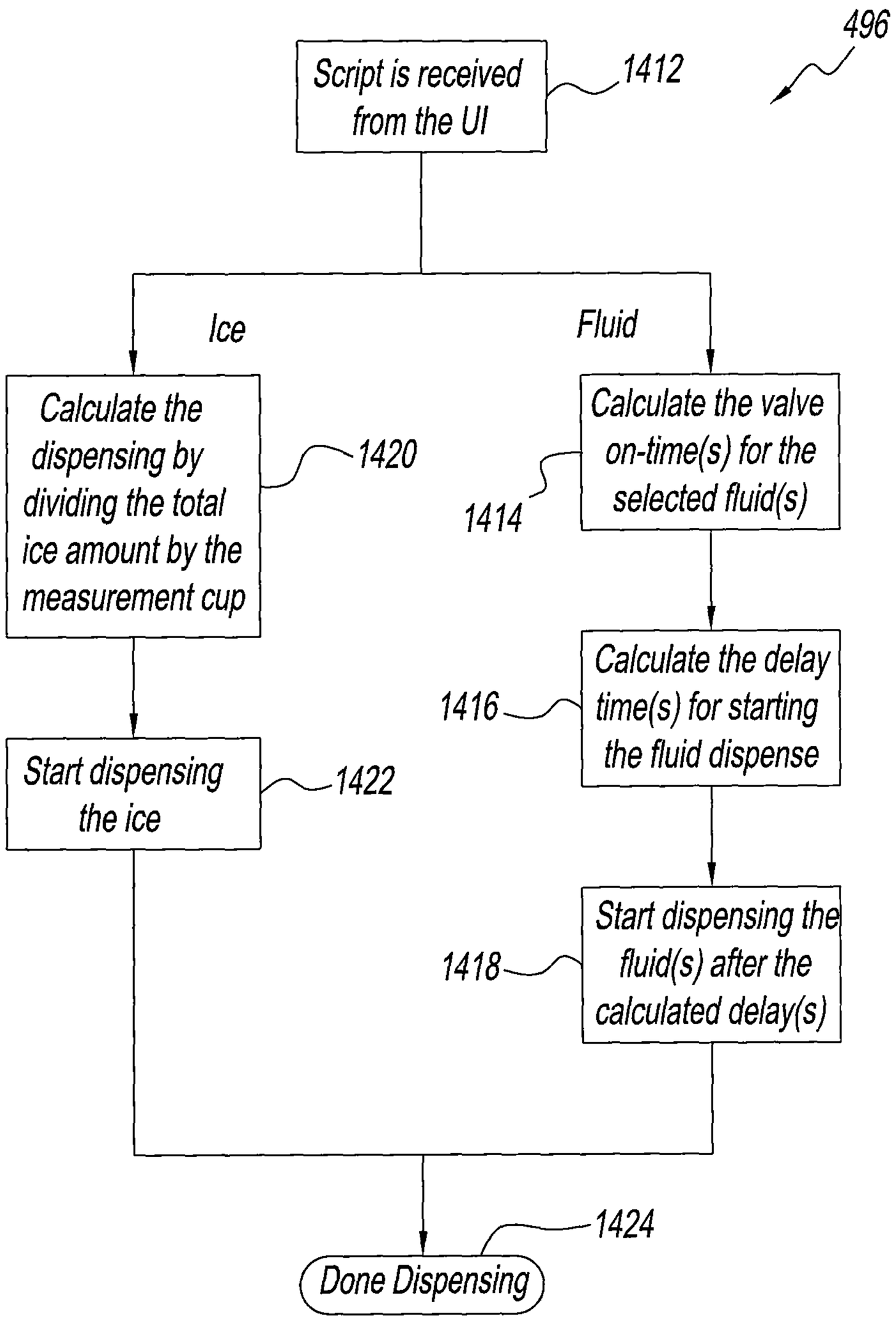

496
Script is received from the UI
1412
Ice
Fluid
Calculate the dispensing by dividing the total ice amount by the measurement cup
1420
Calculate the valve on-time(s) for the selected fluid(s)
1414
Calculate the delay time(s) for starting the fluid dispense
1416
Start dispensing the ice
1422
Start dispensing the fluid(s) after the calculated delay(s)
1418
Done Dispensing
1424

Fig. 48

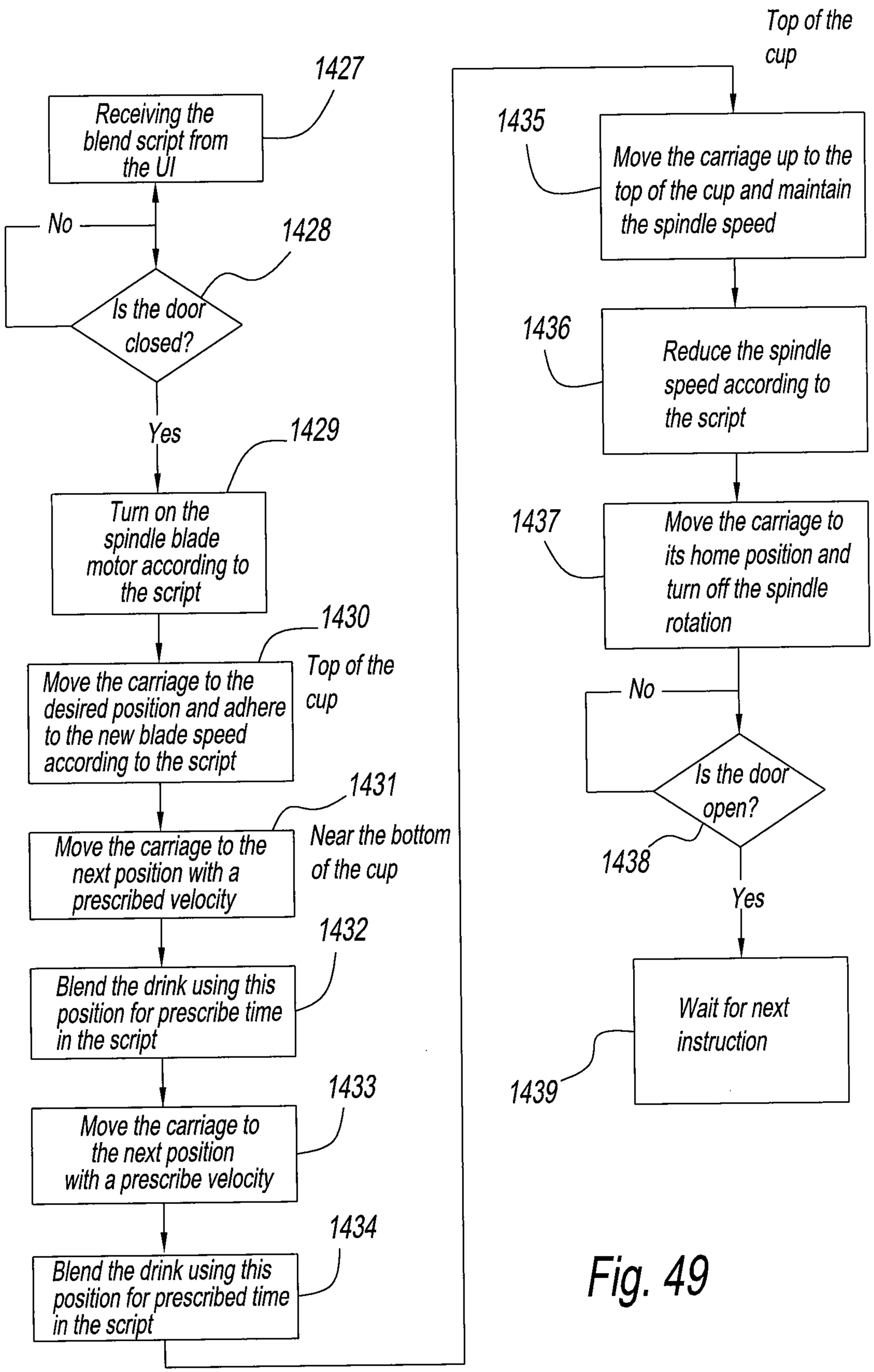

1427
Receiving the blend script from the UI
No
1428
Is the door closed?
Yes
1429
Turn on the spindle blade motor according to the script
1430
Top of the cup
Move the carriage to the desired position and adhere to the new blade speed according to the script
1431
Near the bottom of the cup
Move the carriage to the next position with a prescribed velocity
1432
Blend the drink using this position for prescribe time in the script
1433
Move the carriage to the next position with a prescribe velocity
1434
Blend the drink using this position for prescribed time in the script
Top of the cup
1435
Move the carriage up to the top of the cup and maintain the spindle speed
1436
Reduce the spindle speed according to the script
1437
Move the carriage to its home position and turn off the spindle rotation
No
Is the door open?
1438
Yes
Wait for next instruction
1439

Fig. 49

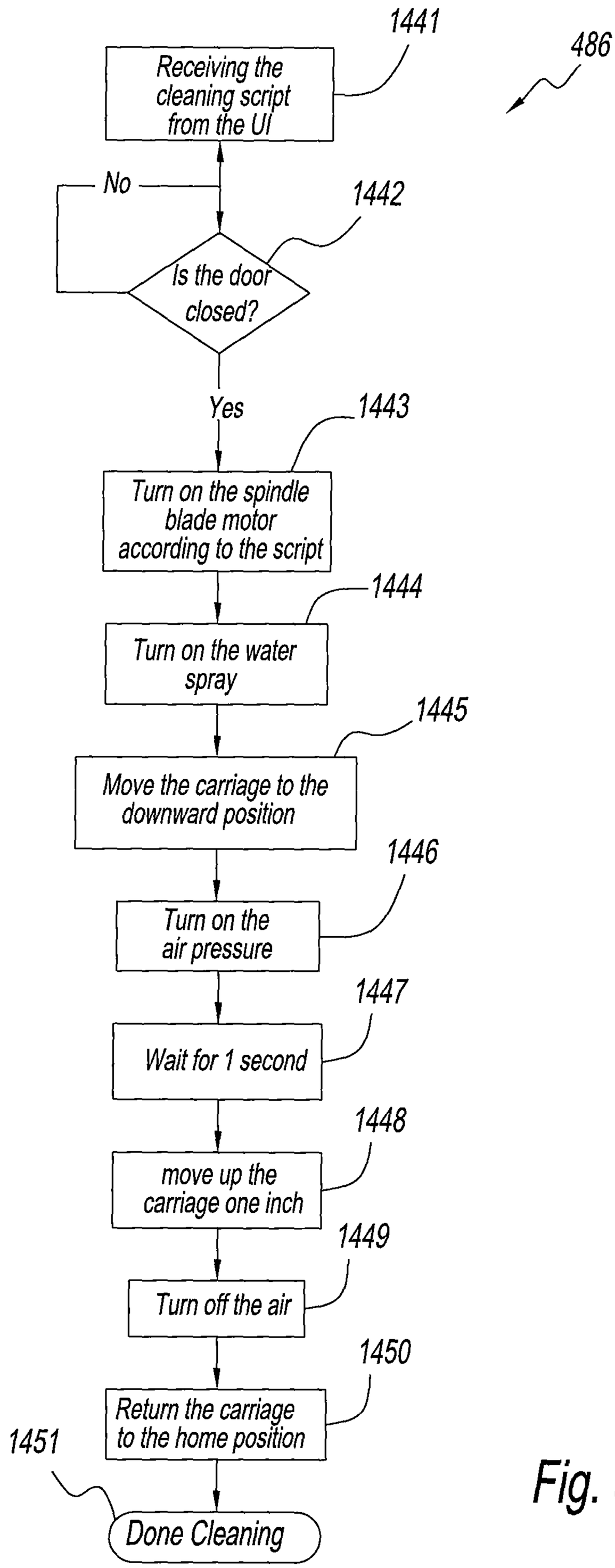

1441
Receiving the cleaning script from the UI
486
No
1442
Is the door closed?
Yes
1443
Turn on the spindle blade motor according to the script
1444
Turn on the water spray
1445
Move the carriage to the downward position
1446
Turn on the air pressure
1447
Wait for 1 second
1448
move up the carriage one inch
1449
Turn off the air
1450
Return the carriage to the home position
1451
Done Cleaning

Fig. 50

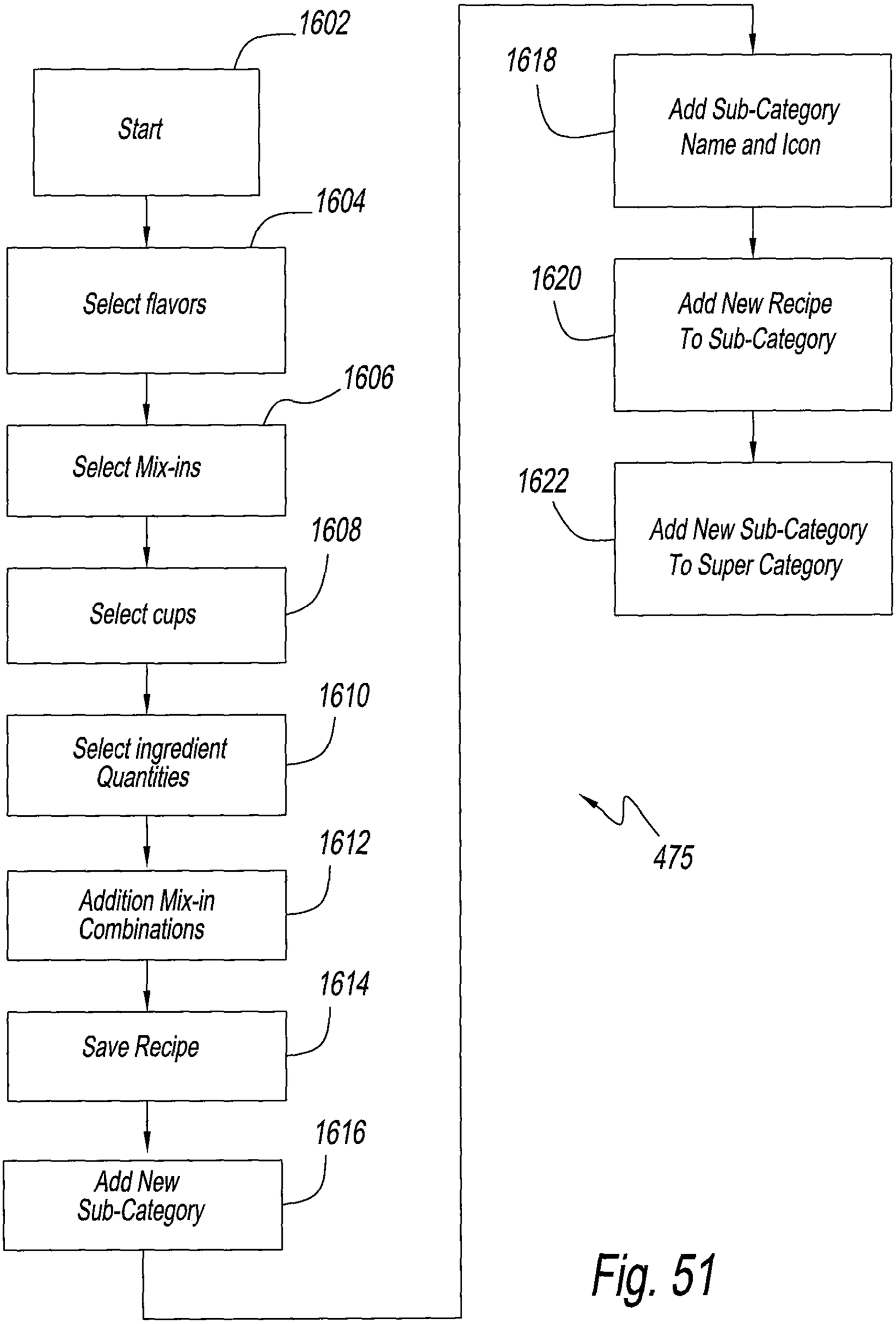

1602
Start
1604
Select flavors
1606
Select Mix-ins
1608
Select cups
1610
Select ingredient Quantities
1612
Addition Mix-in Combinations
1614
Save Recipe
1616
Add New Sub-Category
1618
Add Sub-Category Name and Icon
1620
Add New Recipe To Sub-Category
1622
Add New Sub-Category To Super Category
475

Fig. 51

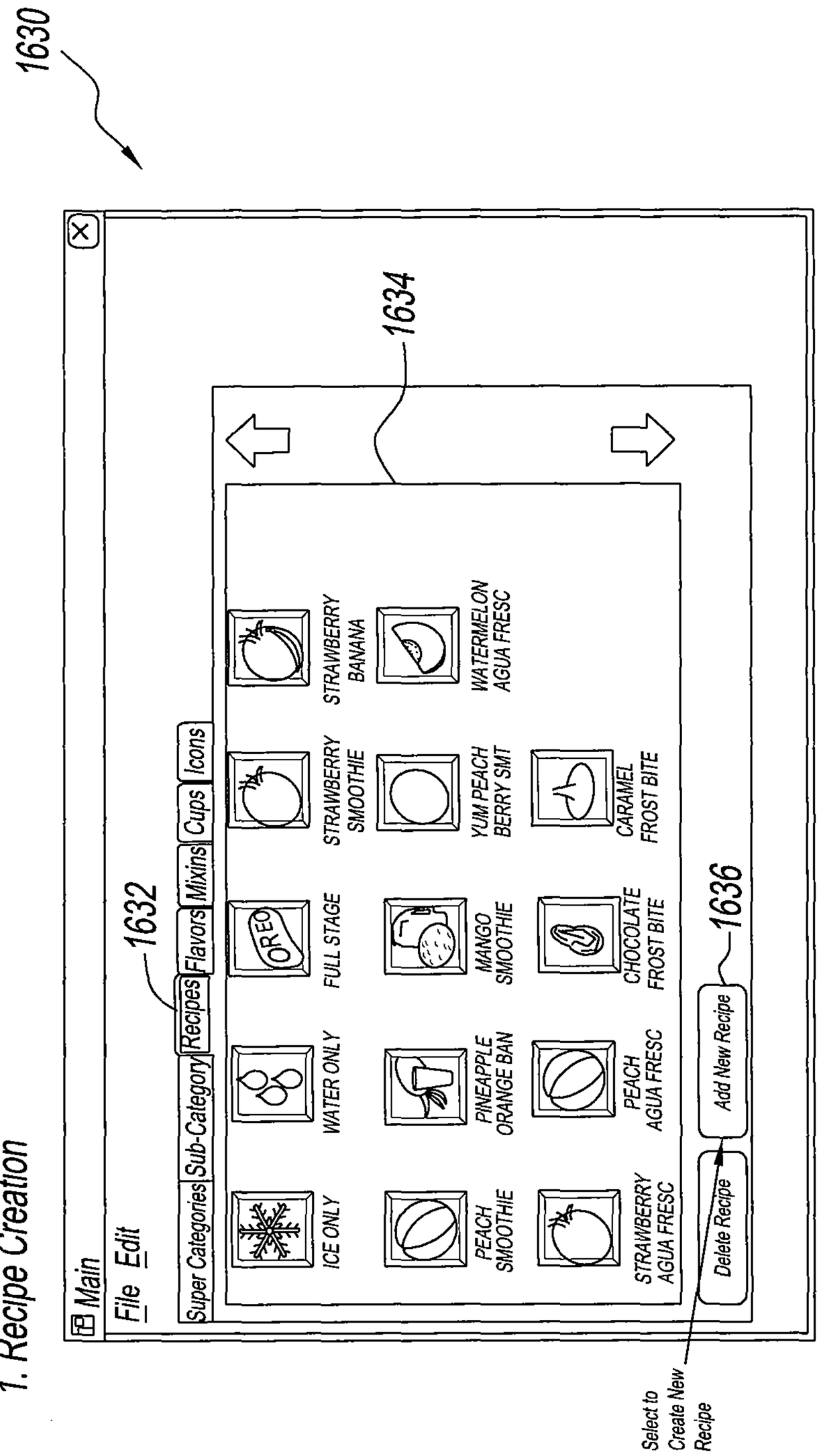

1630
1634
1632
1636
Recipe Creation
Recipe Creation
Main
File Edit
Super Categories
Sub-Category
Recipes
Flavors
Mixins
Cups
Icons
ICE ONLY
WATER ONLY
FULL STAGE
STRAWBERRY SMOOTHIE
PEACH SMOOTHIE
PINEAPPLE ORANGE BAN
MANGO SMOOTHIE
YUM PEACH BERRY SMT
STRAWBERRY AGUA FRESC
PEACH AGUA FRESC
CHOCOLATE FROST BITE
CARAMEL FROST BITE
STRAWBERRY BANANA
WATERMELON AGUA FRESC
Delete Recipe
Add New Recipe
1.
Select to Create New Recipe

Fig. 52

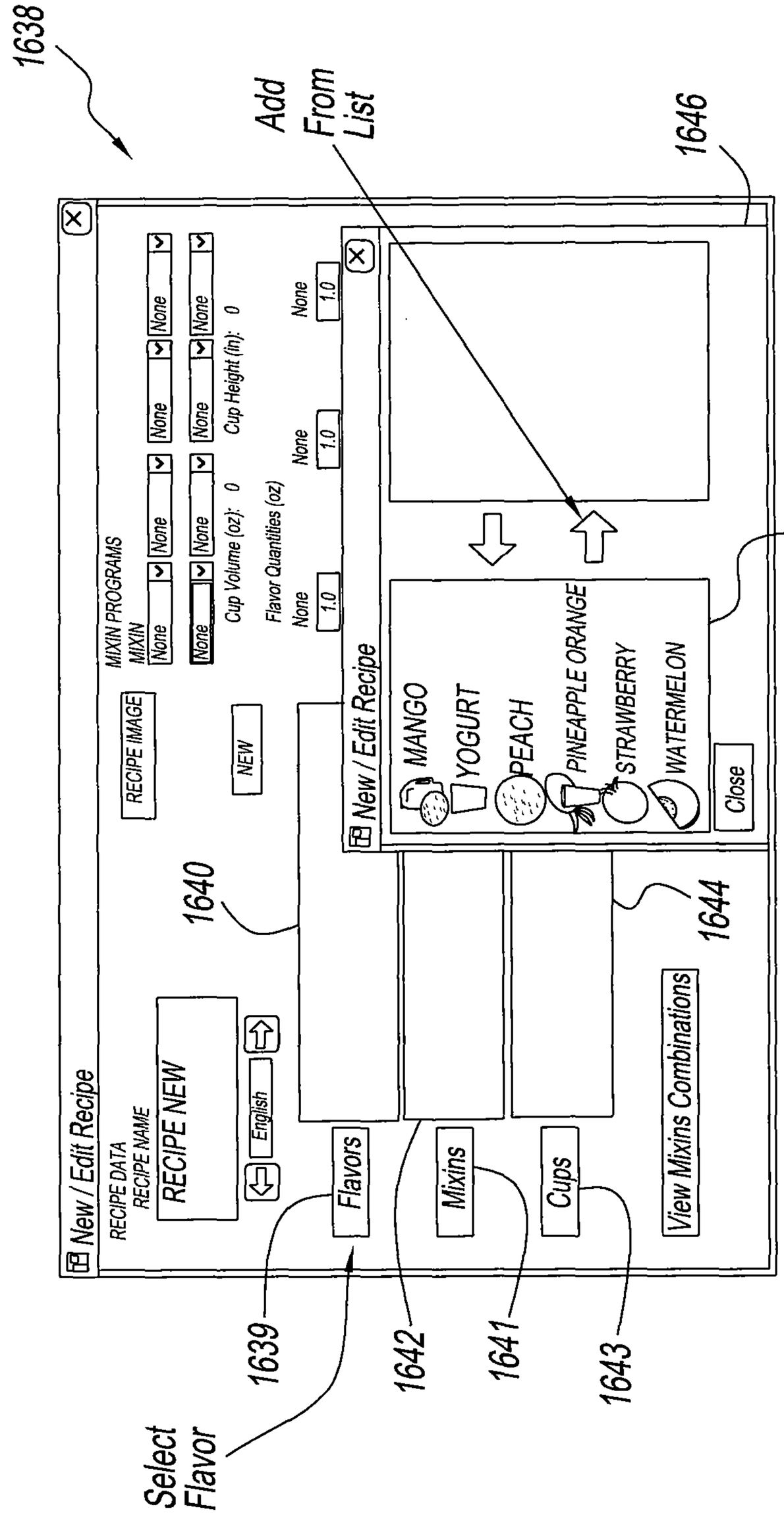

1638
Add From List
1646
1648
MIXIN PROGRAMS
MIXIN
None
Cup Volume (oz): 0
Cup Height (in): 0
Flavor Quantities (oz)
1.0
RECIPE IMAGE
NEW
New / Edit Recipe
MANGO
YOGURT
PEACH
PINEAPPLE ORANGE
STRAWBERRY
WATERMELON
Close
1640
1644
RECIPE DATA
RECIPE NAME
RECIPE NEW
English
Flavors
Mixins
Cups
View Mixins Combinations
Select Flavor
1639
1642
1641
1643

Fig. 53

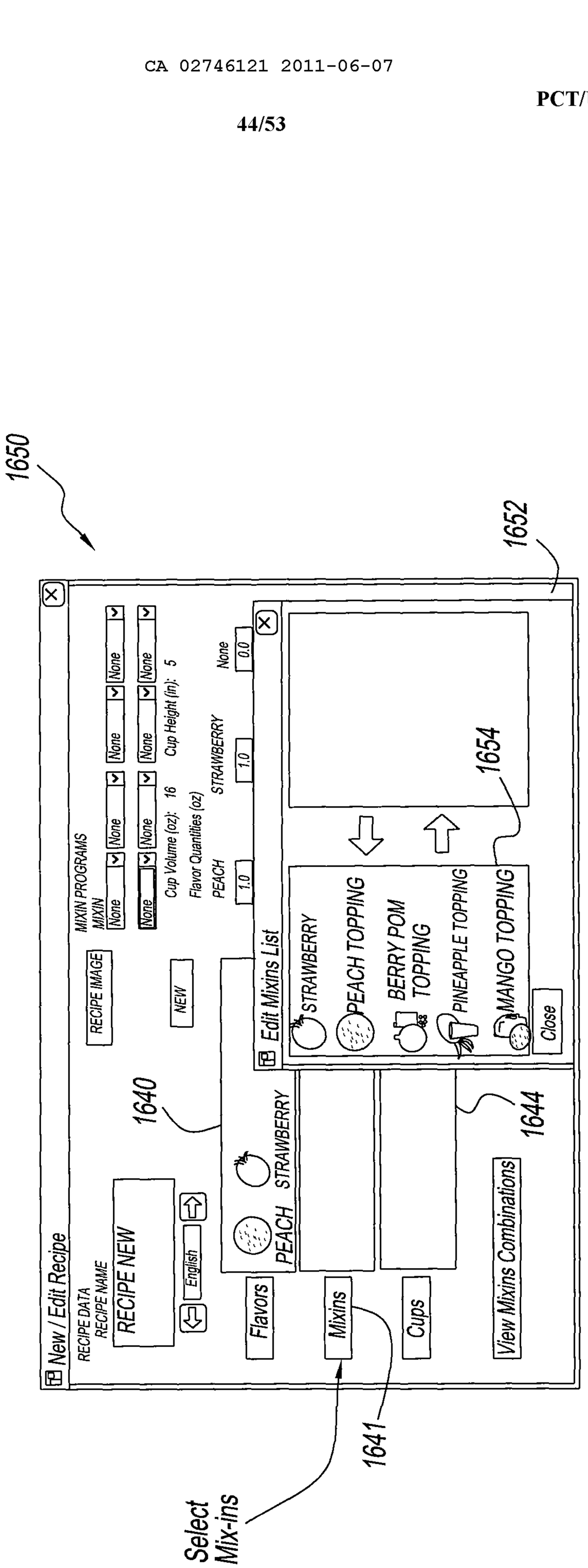

1650
1652
1654
1640
1644
1641
New / Edit Recipe
RECIPE DATA
RECIPE NAME
RECIPE NEW
English
RECIPE IMAGE
NEW
Flavors
Mixins
Cups
View Mixins Combinations
PEACH
STRAWBERRY
MIXIN PROGRAMS
MIXIN
None
Cup Volume (oz): 16
Cup Height (in): 5
Flavor Quantities (oz)
PEACH
1.0
STRAWBERRY
1.0
None
0.0
Edit Mixins List
STRAWBERRY
PEACH TOPPING
BERRY POM TOPPING
PINEAPPLE TOPPING
MANGO TOPPING
Close
Select Mix-ins

Fig. 54

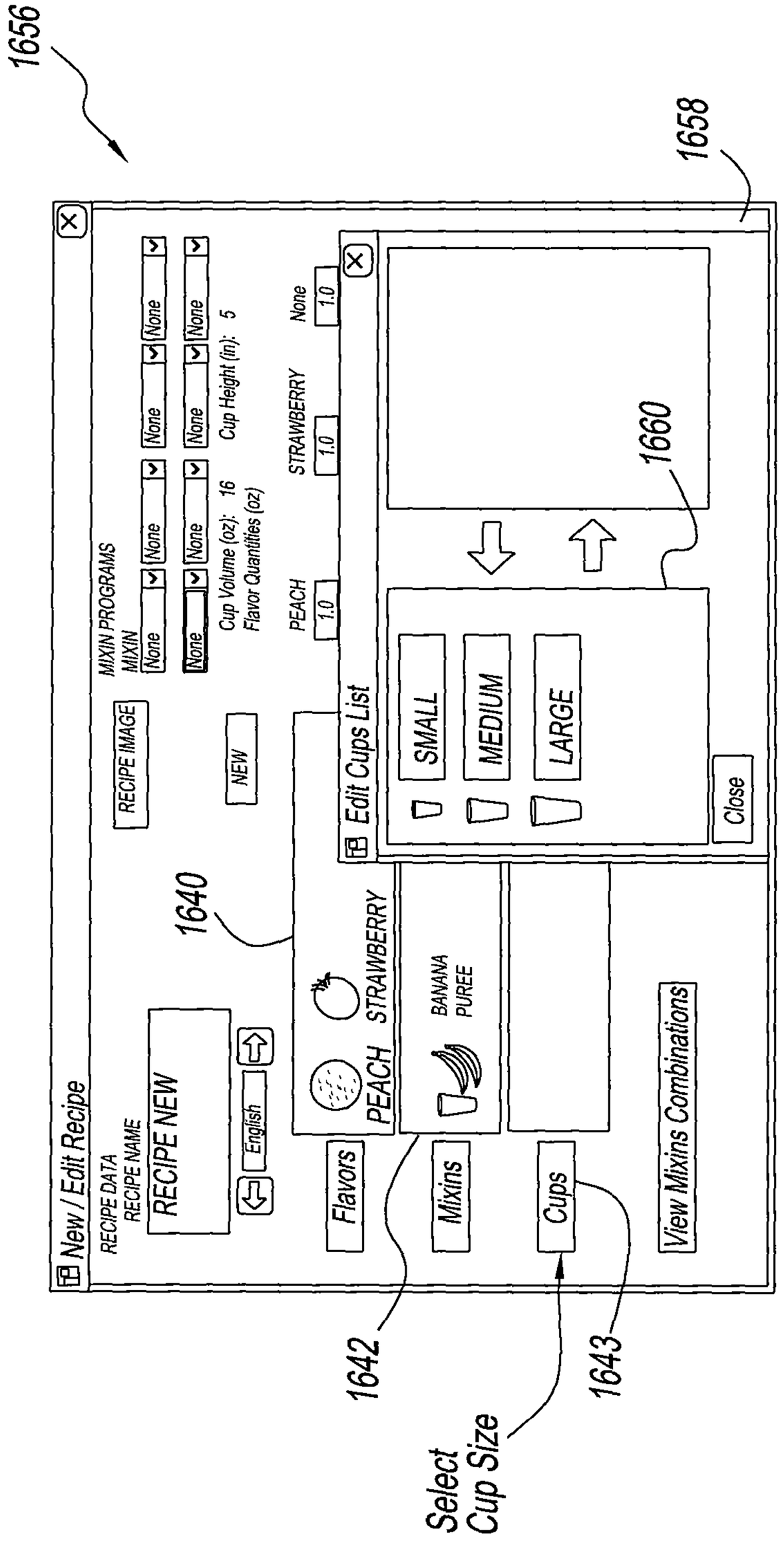

1656
1658
1660
1640
1642
1643
New / Edit Recipe
RECIPE DATA
RECIPE NAME
RECIPE NEW
English
Flavors
Mixins
Cups
View Mixins Combinations
PEACH
STRAWBERRY
BANANA PUREE
RECIPE IMAGE
NEW
MIXIN PROGRAMS
MIXIN
None
Cup Volume
Flavor Quantities (oz)
Cup Height (in): 5
PEACH
STRAWBERRY
1.0
Edit Cups List
SMALL
MEDIUM
LARGE
Close
Select Cup Size

Fig. 55

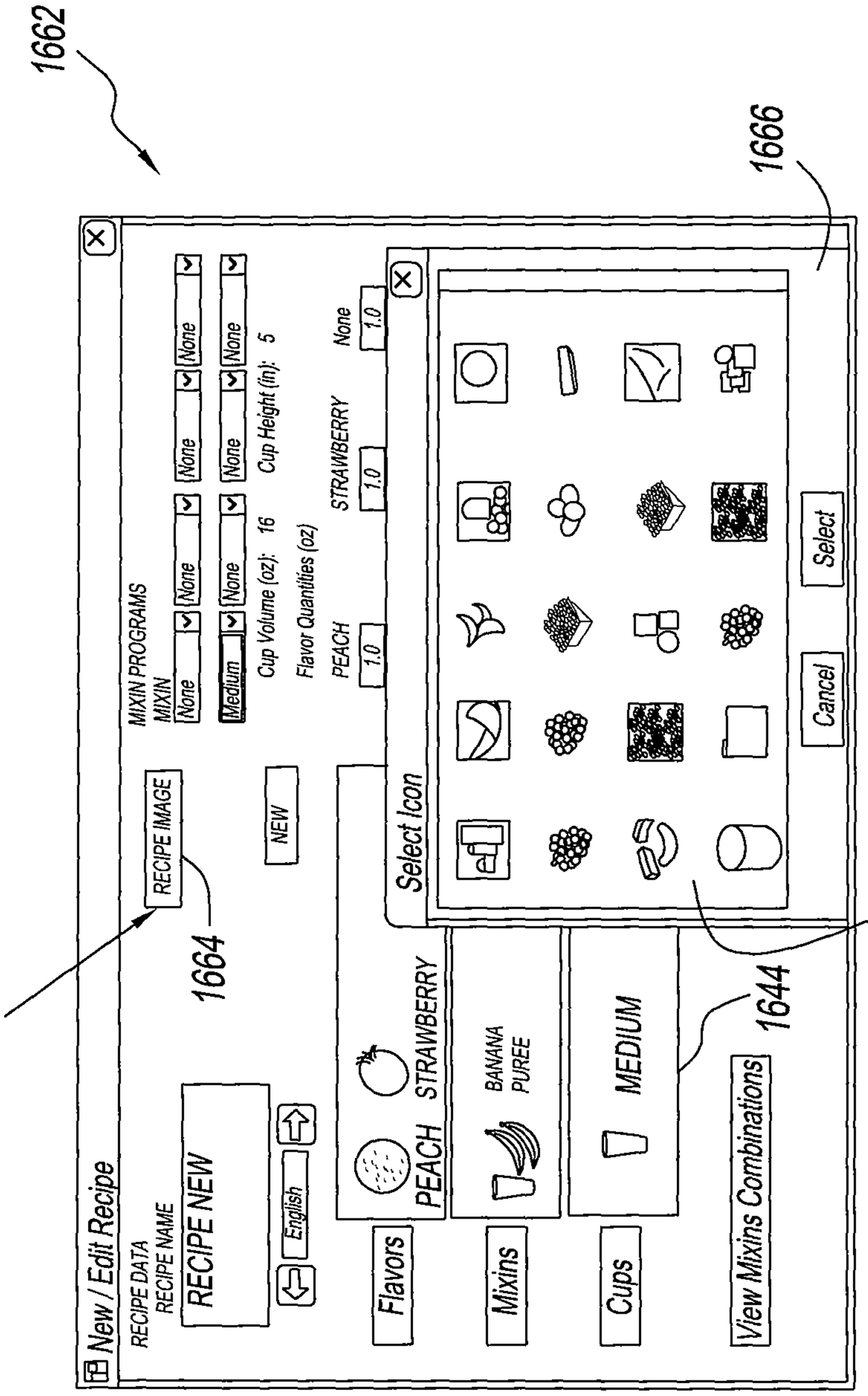

1662
1666
MIXIN PROGRAMS
MIXIN
None
Medium
Cup Volume (oz): 16
Cup Height (in): 5
Flavor Quantities (oz)
PEACH
STRAWBERRY
1.0
Cancel
Select
Recipe Icon
RECIPE IMAGE
1664
NEW
New / Edit Recipe
RECIPE DATA
RECIPE NAME
RECIPE NEW
English
Flavors
Mixins
Cups
BANANA PUREE
MEDIUM
View Mixins Combinations
1644
Select Icon
1668

Fig. 56

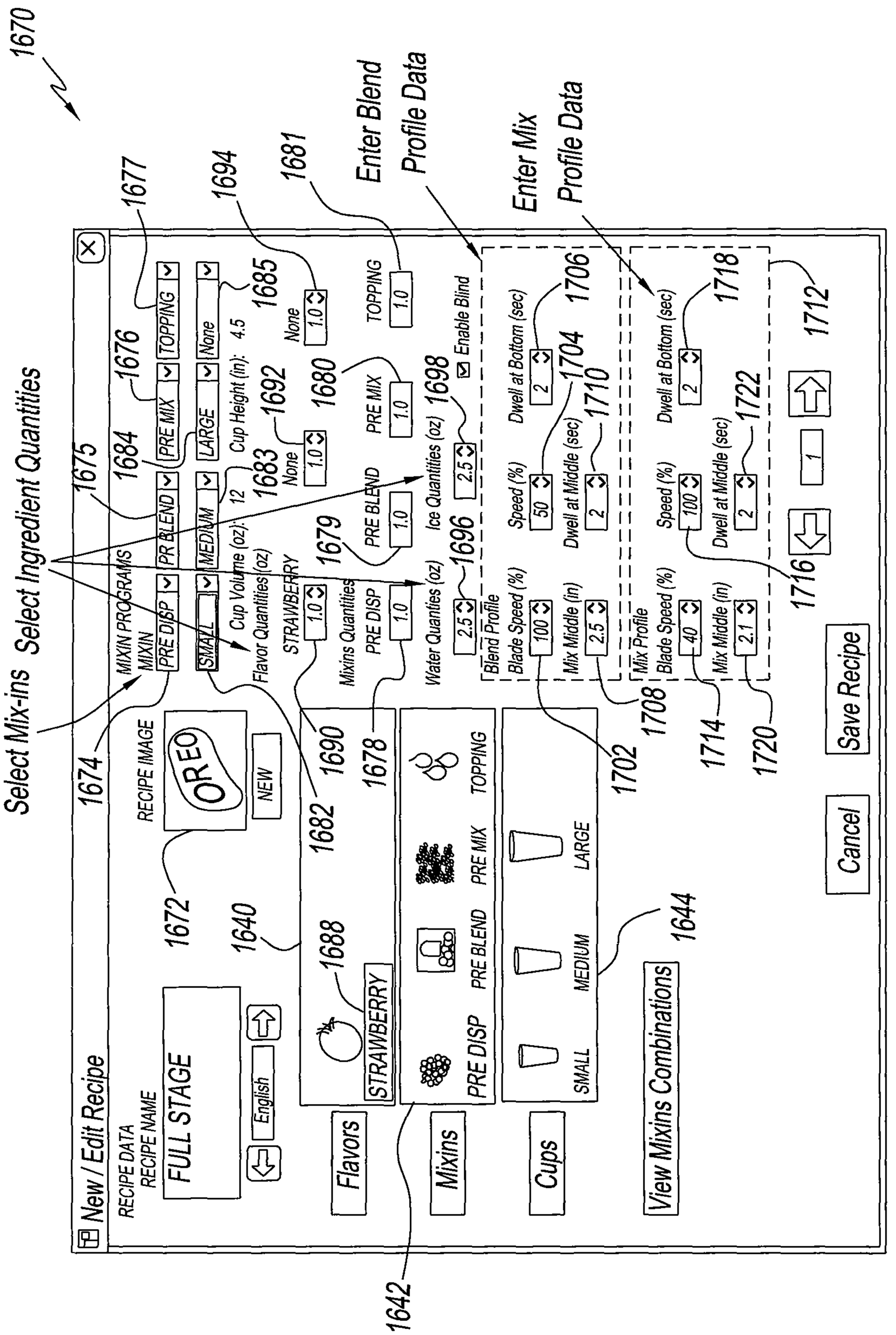

Select Mix-ins
Select Ingredient Quantities
1675
1684
1676
1677
1694
1681
Enter Blend Profile Data
Enter Mix Profile Data
1685
1683
1692
1680
1679
1698
1696
1704
1706
1710
1722
1718
1712
1716
1674
1672
1640
1688
1682
1690
1678
1702
1708
1714
1720
1644
1642
MIXIN PROGRAMS
MIXIN
PRE DISP
PR BLEND
MEDIUM
LARGE
PRE MIX
TOPPING
None
Cup Volume (oz):
12
Cup Height (in):
4.5
Flavor Quantities (oz)
STRAWBERRY
Mixins Quantities
PRE DISP
PRE BLEND
PRE MIX
TOPPING
Water Quantities (oz)
Ice Quantities (oz)
Enable Blind
Blend Profile
Mix Profile
Blade Speed (%)
Speed (%)
Dwell at Bottom (sec)
Mix Middle (in)
Dwell at Middle (sec)
RECIPE IMAGE
OREO
NEW
New / Edit Recipe
RECIPE DATA
RECIPE NAME
FULL STAGE
English
Flavors
Mixins
Cups
View Mixins Combinations
Cancel
Save Recipe

Fig. 57

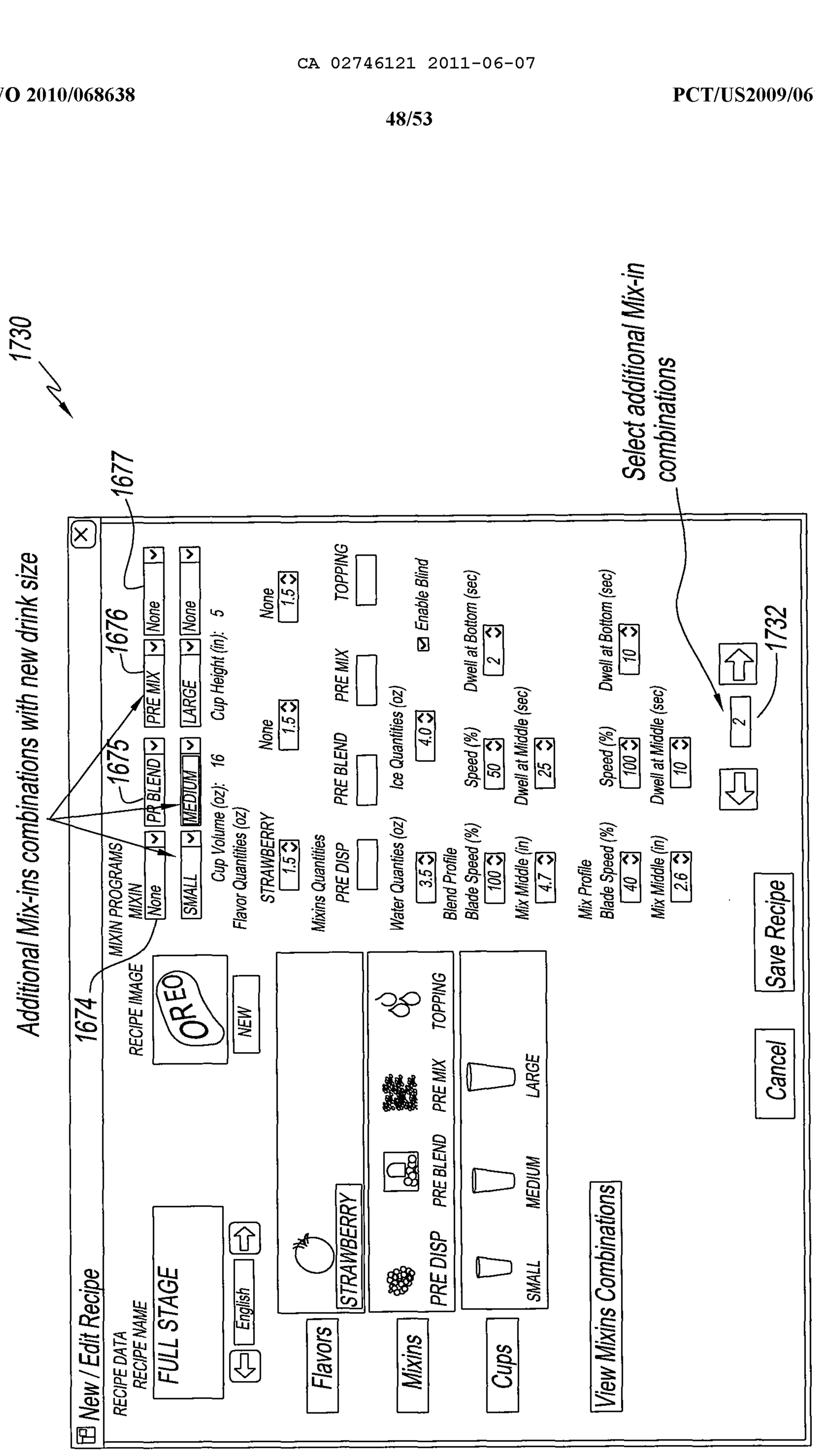

1730
1677
Additional Mix-ins combinations with new drink size
1675
1676
1674
1732
Select additional Mix-in combinations
New / Edit Recipe
RECIPE DATA
RECIPE NAME
FULL STAGE
English
MIXIN PROGRAMS
MIXIN
RECIPE IMAGE
OREO
NEW
PR BLEND
PRE MIX
None
MEDIUM
LARGE
Cup Volume (oz): 16
Cup Height (in): 5
Flavor Quantities (oz)
STRAWBERRY
1.5
Mixins Quantities
PRE DISP
PRE BLEND
PRE MIX
TOPPING
Ice Quantities (oz)
4.0
Enable Blind
Water Quantities (oz)
3.5
Blend Profile
Speed (%)
Dwell at Bottom (sec)
50
2
Blade Speed (%)
100
Dwell at Middle (sec)
25
10
Mix Middle (in)
4.7
2.6
Mix Profile
40
Mixins Combinations
Flavors
Mixins
Cups
View Mixins
Cancel
Save Recipe

Fig. 58

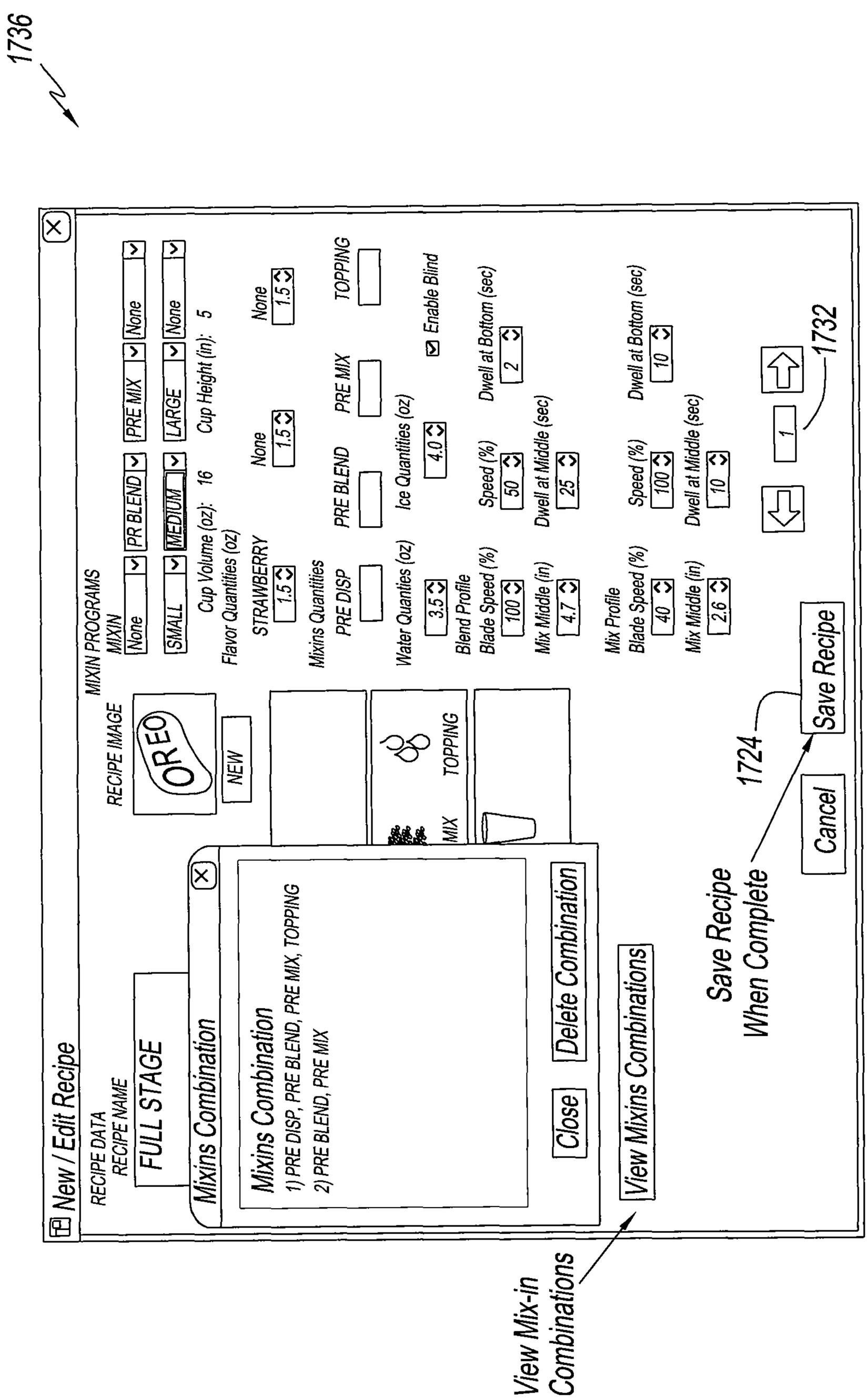

1736
MIXIN PROGRAMS
MIXIN
None
PR BLEND
PRE MIX
None
SMALL
MEDIUM
LARGE
None
Cup Volume (oz): 16
Cup Height (in): 5
Flavor Quantities (oz)
STRAWBERRY
None
None
1.5
1.5
1.5
Mixins Quantities
PRE DISP
PRE BLEND
PRE MIX
TOPPING
Water Quantities (oz)
Ice Quantities (oz)
3.5
4.0
Enable Blind
Blend Profile
Blade Speed (%)
Speed (%)
Dwell at Bottom (sec)
100
50
2
Mix Middle (in)
Dwell at Middle (sec)
4.7
25
Mix Profile
Blade Speed (%)
Speed (%)
Dwell at Bottom (sec)
40
100
10
Mix Middle (in)
Dwell at Middle (sec)
2.6
10
1
1732
Save Recipe
RECIPE IMAGE
OREO
NEW
MIX
TOPPING
New / Edit Recipe
RECIPE DATA
RECIPE NAME
FULL STAGE
Mixins Combination
Mixins Combination
1) PRE DISP, PRE BLEND, PRE MIX, TOPPING
2) PRE BLEND, PRE MIX
Close
Delete Combination
View Mixins Combinations
Save Recipe
When Complete
1724
Cancel
Save Recipe
View Mix-in
Combinations

Fig. 59

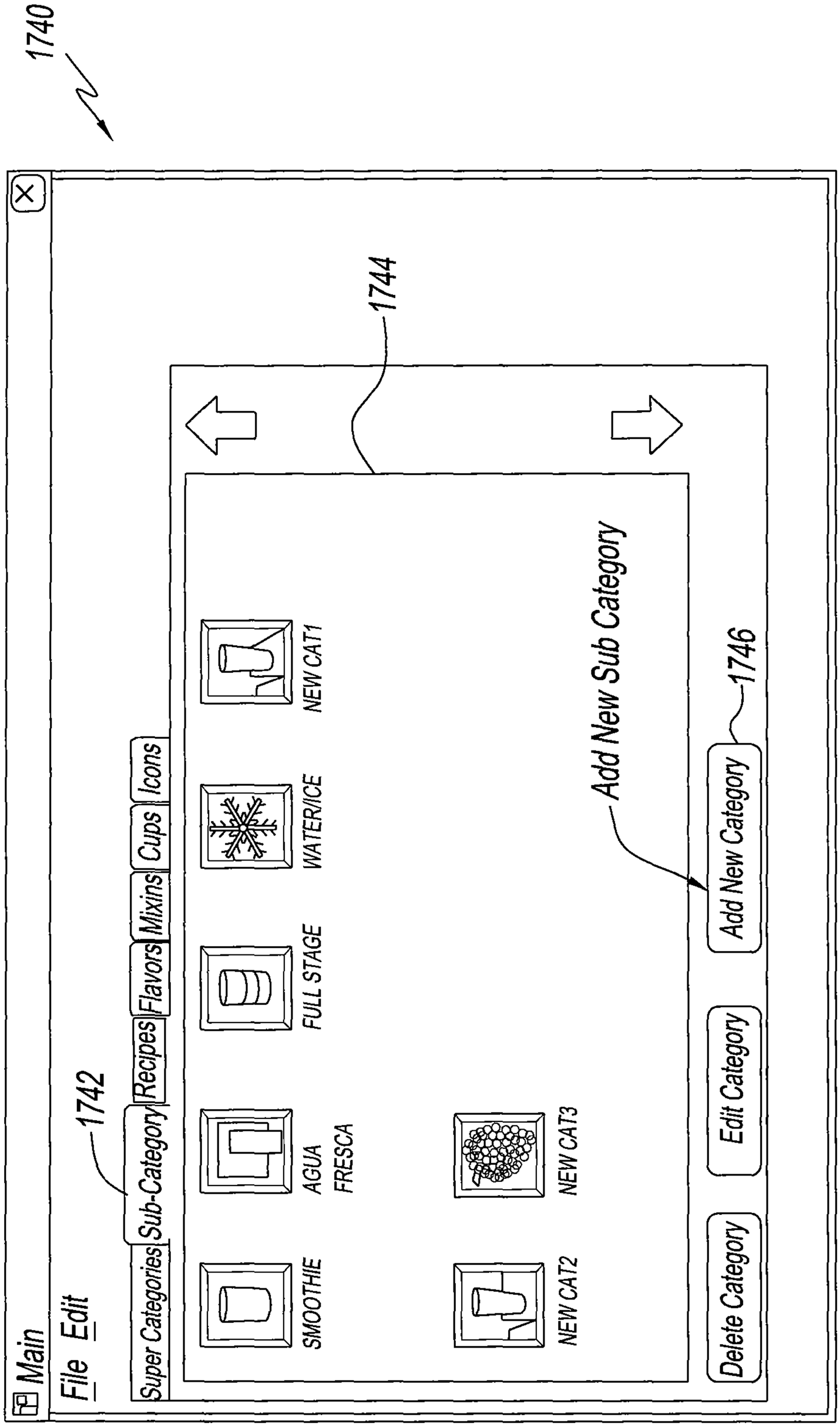

1740
1744
1742
1746
Main
File Edit
Super Categories
Sub-Category
Recipes
Flavors
Mixins
Cups
Icons
SMOOTHIE
AGUA FRESCA
FULL STAGE
WATER/ICE
NEW CAT2
NEW CAT3
NEW CAT1
Add New Sub Category
Delete Category
Edit Category
Add New Category

Fig. 60

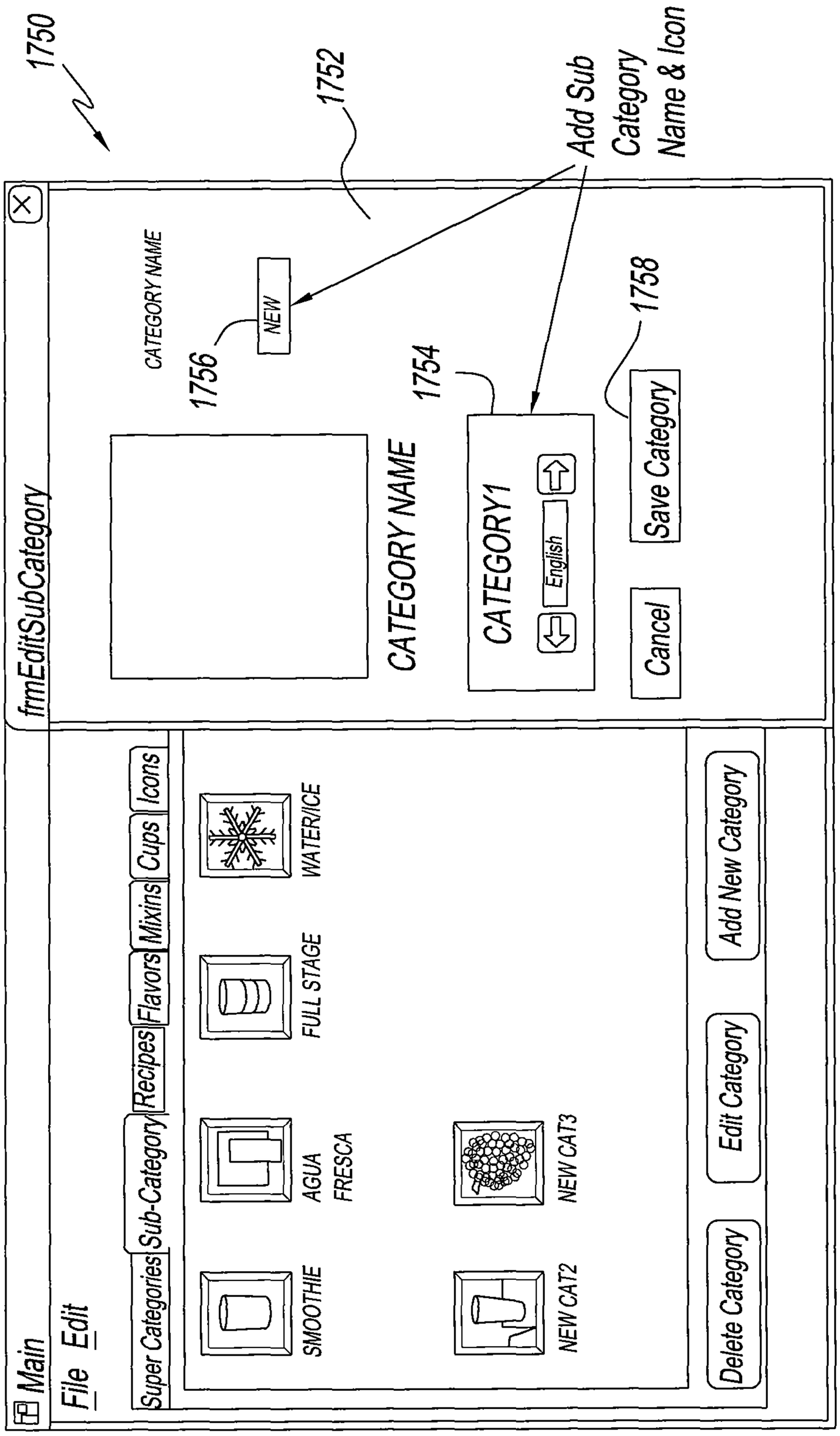

1750
1752
Add Sub Category Name & Icon
frmEditSubCategory
CATEGORY NAME
1756
NEW
1754
CATEGORY NAME
CATEGORY1
English
1758
Save Category
Cancel
Main
File Edit
Super Categories
Sub-Category
Recipes
Flavors
Mixins
Cups
Icons
AGUA FRESCA
FULL STAGE
WATER/ICE
SMOOTHIE
NEW CAT3
NEW CAT2
Edit Category
Add New Category
Delete Category

Fig. 61

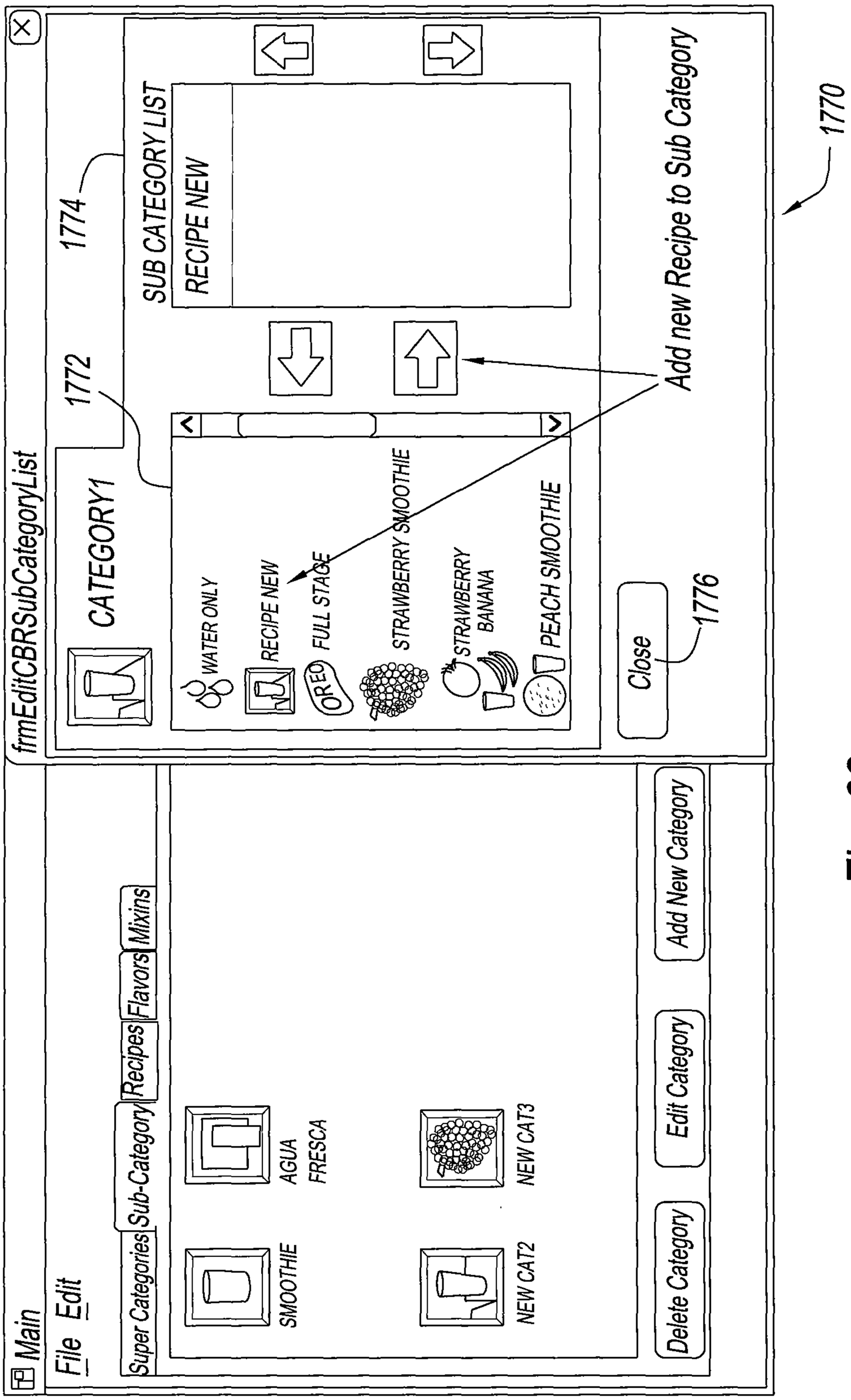

frmEditCBRSubCategoryList
1774
1772
1770
CATEGORY1
SUB CATEGORY LIST
RECIPE NEW
Add new Recipe to Sub Category
WATER ONLY
RECIPE NEW
FULL STAGE
OREO
STRAWBERRY SMOOTHIE
STRAWBERRY BANANA
PEACH SMOOTHIE
Close
1776
Main
File Edit
Super Categories
Sub-Category
Recipes
Flavors
Mixins
SMOOTHIE
AGUA FRESCA
NEW CAT2
NEW CAT3
Edit Category
Add New Category
Delete Category

Fig. 62

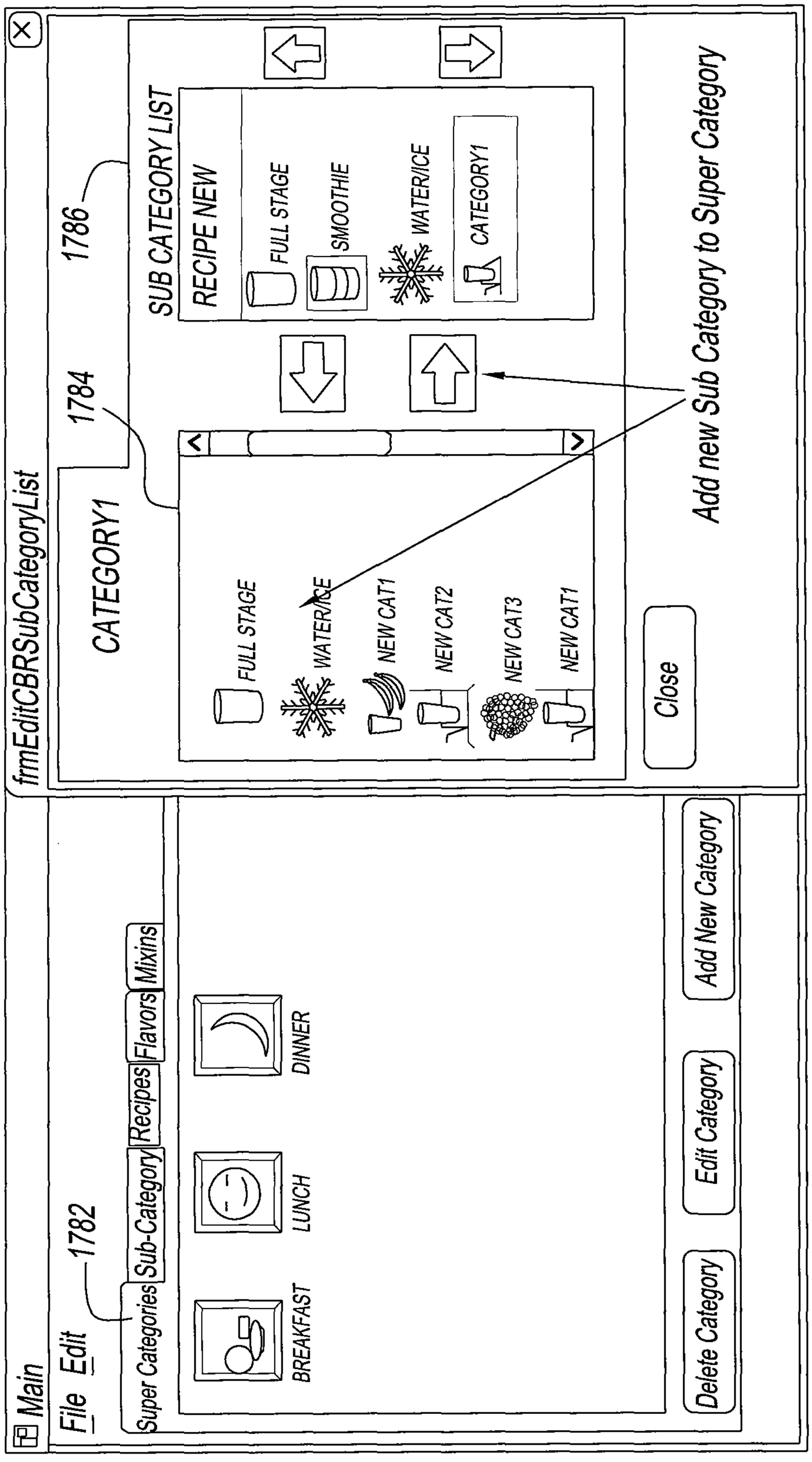
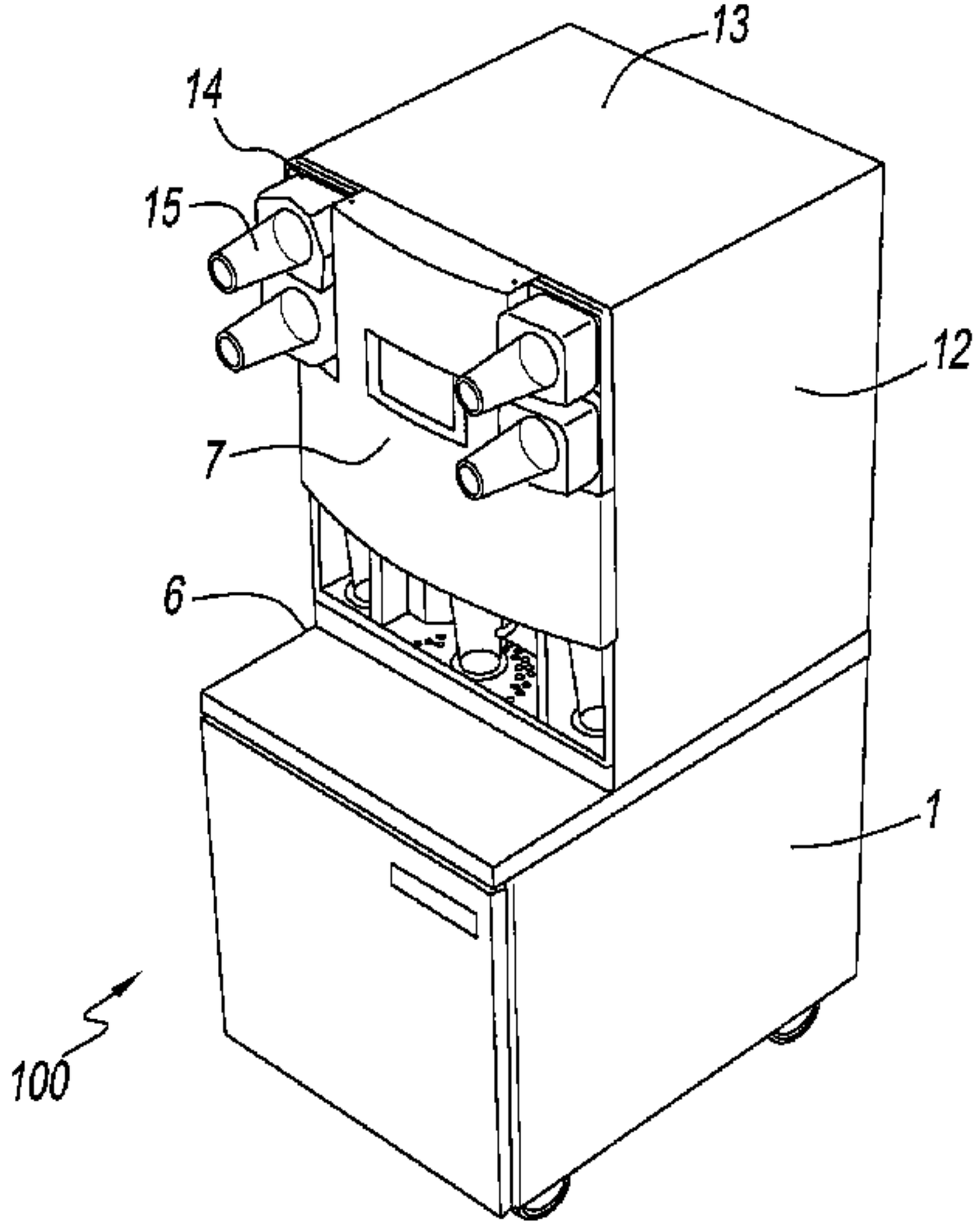

frmEditCBRSubCategoryList
1786
SUB CATEGORY LIST
RECIPE NEW
FULL STAGE
SMOOTHIE
WATER/ICE
CATEGORY1
1780
Add new Sub Category to Super Category
1784
CATEGORY1
FULL STAGE
WATER/ICE
NEW CAT1
NEW CAT2
NEW CAT3
NEW CAT1
Close
Add new Sub Category
1782
Super Categories
Sub-Category
Recipes
Flavors
Mixins
LUNCH
DINNER
BREAKFAST
Edit Category
Add New Category
Delete Category
Main
File Edit
1782

Fig. 63

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